# DRAFT Biological Resources

County of San Diego

Guidelines for Determining Significance

Adopted
**Month____Day____Year____**

**Circulated for Public Review:**
**August 4 - 24, 2006**

I hereby certify that these **Guidelines for Determining Significance for Biological Resources** are a part of the County of San Diego Guidelines for Determining Significance and were considered by the Director of Planning and Land Use, in coordination with the Director of Public Works on the _____ day of ____, 2006.

_____
GARY PRYOR, Director of Planning and Land Use

_____
JOHN SNYDER, Director of Public Works

_____
Attest: ERIC GIBSON, Deputy Director

I hereby certify that these **Guidelines for Determining Significance for Biological Resources** are a part of the County of San Diego Guidelines for Determining Significance and were adopted by the Deputy Chief Administrative Officer (DCAO) of the Land Use and Environment Group on the _____ day of ____ 2006. The Director of Planning and Land Use is authorized to adopt revisions to these Guidelines for Determining Significance for Biological Resources, provided that any revisions to Chapter 4.0 must be approved by the Deputy CAO.

Adopted _____ 2006

_____
CHANDRA WALLAR, Deputy CAO

Attest: _____

_____, Secretary

## EXPLANATION

The County of San Diego Guidelines for Determining Significance and information presented herein shall be used by County staff for the review of discretionary projects and environmental documents pursuant to the California Environmental Quality Act (CEQA). These Guidelines present a range of quantitative, qualitative, and performance levels for particular environmental effects. Normally, (in the absence of substantial evidence to the contrary), non-compliance with a particular standard stated in these Guidelines will mean the project will result in a significant effect, whereas compliance will normally mean the effect will be determined to be "less than significant." Section 15064(b) of the State CEQA Guidelines states:

> "The determination whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on factual and scientific data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

These Guidelines shall assist in providing a consistent, objective and predictable evaluation of significant effects. These Guidelines are not binding on any decision-maker and should not be substituted for the use of independent judgment to determine significance or the evaluation of evidence in the record. The County reserves the right to modify these Guidelines in the event of scientific discovery or alterations in factual data that may alter the common application of a Guideline.

## TABLE OF CONTENTS



## LIST OF ATTACHMENTS

## LIST OF TABLES

## List of Acronyms

| | |
|---|---|
| ACOE | Army Corps of Engineers |
| BMO | Biological Mitigation Ordinance |
| CDFG | California Department of Fish and Game |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CSS | Coastal Sage Scrub |
| DPLU | Department of Planning and Land Use |
| DPR | Department of Parks and Recreation |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| FMP | Framework Management Plan |
| HCP | Habitat Conservation Plan |
| HLP | Habitat Loss Permit |
| HMP | Habitat Management Plan |
| MBTA | Migratory Bird Treaty Act |
| MSCP | Multiple Species Conservation Program |
| NCCP | Natural Communities Conservation Plan |
| RCA | Resource Conservation Areas |
| RPO | County of San Diego Resource Protection Ordinance |
| SAMP | Special Area Management Plan |
| USFWS | United States Fish and Wildlife Service |
| USC | United States Code |

## INTRODUCTION

This document provides guidance for evaluating adverse environmental effects that a proposed project may have on biological resources. Specifically, this document addresses the following questions listed in the California Environmental Quality Act (CEQA) Guidelines, Appendix G, IV. Biological Resources and IX. Land Use and Planning:

IV. Biological Resources - Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?

IX. Land Use and Planning – Would the project:

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

## 1.0 GENERAL PRINCIPLES AND EXISTING CONDITIONS

San Diego County has long been known as a unique environment for biological resources. Both the number and diversity of the habitats and species present in the County far exceeds that of most other counties in the United States. Several factors are responsible for this unique biological environment, including climate, geology, topography, microhabitats, and endemism.

The loss of native habitat to development and agricultural uses over the last several decades has caused many of the region's biological resources to become increasingly rare. Many habitat types now occupy less than 5-10% of their historical range. The majority of habitat loss has occurred along the coast and inland mesas. Hence, most of the habitat types that have experienced the greatest losses and are now considered the most sensitive are found within these areas, such as southern maritime chaparral, vernal pools, coastal dunes, maritime succulent scrub and freshwater habitats. Other habitat types, such as coastal sage scrub, grasslands, oak woodlands and various chaparral habitats are becoming more sensitive as residential development extends further into previously rural areas in the north and along the eastern foothills of the County.

The far eastern parts of the County, from the mountain areas to the desert regions, have been left relatively intact thus far and may remain so given that large portions of these areas are publicly owned. However, some habitat types in these areas, such as coniferous forest, Colorado desert wash scrub and desert sink scrub, are still considered sensitive for reasons other than historical loss, such as limited distribution, the potential to host sensitive species, or the inability to recover from disturbance.

Today San Diego supports over 400 sensitive plants and wildlife. These species range from uncommon to critically endangered. Some of these species require immediate, proactive measures, particularly those that are already listed as threatened or endangered. For others, extirpation or extinction is not quite so imminent, but their long-term survival may depend upon the precautionary actions taken now, including ensuring that a sufficient amount of native habitat is preserved in a viable manner. Refer to Tables 2 and 3 for lists of County-sensitive plants and wildlife.

Most of the County's conservation policies focus on preservation at the ecosystem and habitat level. The single species approach is only used for particularly sensitive species or those species with unusual life history needs. In all cases, any single-species methods are used in conjunction with the habitat or ecosystem-level approach. The County of San Diego has established policies that aim to balance the needs of humans with the need to protect biological resources. The County's policies have been designed to maintain the optimal health and viability of each ecosystem and habitat given the existing and potential environmental conditions and constraints.

## 2.0 EXISTING REGULATIONS AND STANDARDS

Several Federal, State and local regulations have been established to protect and conserve biological resources. The descriptions below provide a brief overview of the most appropriate regulations and their respective requirements.

### 2.1 Federal Regulations and Standards

**Federal Endangered Species Act** [U.S.C Title 16, Chapter 35, Sections 1531-1544, http://www4.law.cornell.edu/uscode/16/ch35.html ]
Enacted in 1973, the Endangered Species Act (ESA) provides for the conservation of threatened and endangered species and their ecosystems. The Act prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from the U.S. Fish and Wildlife Service (USFWS) through a permit under Section 4(d), 7 or 10(a) of the Act. Under the Endangered Species Act, "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

**Migratory Bird Treaty Act** [U.S.C Title 16, Chapter 7, Subchapter II, Sections 703-712, http://www4.law.cornell.edu/uscode/16/ch7schII.html ]
Congress passed the Migratory Bird Treaty Act (MBTA) in 1918 to prohibit the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA. The prohibition applies to birds included in the respective international conventions between the U.S. and Great Britain, the U.S. and Mexico, the U.S. and Japan, and the U.S. and Russia.

**Bald and Golden Eagle Protection Act** [U.S.C Title 16, Chapter 5A, Subchapter II, Sections 668 a-d, http://www4.law.cornell.edu/uscode/html/uscode16/usc_sup_01_16_10_5A_20_II.html]
When first enacted in 1940, the Act prohibited the take, transport or sale of bald eagles, their eggs or any part of an eagle except where expressly allowed by the Secretary of Interior. The Act was amended in 1962 to extend the prohibitions to the golden eagle.

**Federal Water Pollution Control Act (Clean Water Act), 1972** [U.S.C Title 33, Ch.26, Sub-Ch.I-VI., http://www4.law.cornell.edu/uscode/33/ch26.html ]
The Federal Water Pollution Control Act was first passed by Congress in 1948. The Act was later amended and became known as the Clean Water Act. The Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States. It gives the U.S. Environmental Protection Agency (EPA) the authority to implement pollution control programs, including setting wastewater standards for industry and water quality standards for contaminants in surface waters. The Act makes it unlawful for any person to discharge any pollutant from a point source into navigable waters, without a permit under its provisions. Clean Water Act 404 permits are issued by the U.S. Army Corps of Engineers for dredge/fill activities within wetlands or non-wetland waters of the U.S. Clean Water Act 401 certifications are issued by the Regional Water Quality Control Board for activities requiring a federal permit or license which may result in discharge of pollutants into waters of the U.S.

## 2.2 State Regulations and Standards

**California Environmental Quality Act (CEQA)** [Public Resources Code 21000-21178; California Code of Regulations, Guidelines for Implementation of CEQA, Appendix G, Title 14, Chapter 3, §15000-15387. http://ceres.ca.gov/topic/env_law/ceqa/guidelines/]
The California Environmental Quality Act requires that biological resources be considered when assessing the environmental impacts resulting from proposed actions. CEQA does not specifically define what constitutes an "adverse effect" on a biological resource. Instead, lead agencies are charged with determining what specifically should be considered an impact.

**California Fish and Game Code** [http://www.leginfo.ca.gov]
The California Fish and Game (CFG) Code regulates the taking or possession of birds, mammals, fish, amphibia and reptiles, as well as natural resources such as wetlands and waters of the state. It includes the California Endangered Species Act (CESA; Sections 2050-2115) and Streambed Alternation Agreement regulations (Section 1602), as well as provisions for legal hunting and fishing, and tribal agreements for activities involving take of native wildlife.

**California Endangered Species Act** [California Fish and Game Code, Division 3, Chapter 1.5, Sections 2050-2115: http://www.leginfo.ca.gov]
The California Endangered Species Act (CESA) generally parallels the main provisions of the Federal Endangered Species Act (ESA) and is administered by the California Department of Fish and Game (CDFG). The CESA prohibits take of any species that the California Fish and Game Commission determines to be a threatened or endangered species. CESA allows for take incidental to otherwise lawful development projects upon approval from CDFG. Under the California Fish and Game Code, "take" is defined as to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.

**Porter-Cologne Water Quality Control Act** [California Water Code, Division 7, Sections 13000-14958 http://www.leginfo.ca.gov]
This Act provides for statewide coordination of water quality regulations. The Act established the California State Water Resources Control Board as the statewide authority and nine separate Regional Water Quality Control Boards to oversee water quality on a day-to-day basis at the regional/local level.

## 2.3 Local Regulations and Standards

**San Diego County General Plan – Open Space Element (Part I), Conservation Element (Part X), and Community and Subregional Plans** [http://www.co.san-diego.ca.us/cnty/cntydepts/landuse/planning/zoning/]
The Open Space Element and the Conservation Element of the General Plan provide guiding principles for the conservation of biological resources. The Open Space Element outlines the goals and policies pertaining to each type of open space, not all of which are for the preservation of biological resources. The Conservation Element,

specifically Chapters 3 and 4 address County policies relating to water, vegetation and wildlife habitat. Appendix K of the Conservation Element outlines the County's Resource Conservation Areas (RCA), which are further described and delineated in each of the Community and Subregional Plans. Each RCA has been designated as such for a purpose specific to that area. When a site is located within a mapped RCA, the project must comply with the relevant policies for that RCA (i.e., avoidance of oaks, etc.).

**County of San Diego Zoning Ordinance** [http://www.co.san-diego.ca.us/cnty/cntydepts/landuse/planning/zoning/]
Land may also have a zoning designation or Special Area Regulation with certain restrictions pursuant to the Zoning Ordinance. For instance, lands may have a zoning designation of S81 Ecological Resource Area Regulations. The few uses allowed on lands with this designation are subject to strict provisions and limitations. The Zoning Ordinance also applies other Special Area Regulations with specific restrictions and provisions, including designator G (Sensitive Resource), R (Coastal Resource Protection Area) and/or V (Vernal Pool Area).

**Multiple Species Conservation Program and Biological Mitigation Ordinance**
[County of San Diego, Multiple Species Conservation Program (MSCP), County of San Diego Subarea Plan, 1997 and County of San Diego, Biological Mitigation Ordinance, (Ord. Nos. 8845, 9246) 1998 (new series) www.co.san-diego.ca.us]
The MSCP is a long-term regional conservation plan designed to establish a connected preserve system that protects the County's sensitive species and habitats. The MSCP covers 582,243 acres over 12 jurisdictions. Each jurisdiction will have their own subarea plan to be implemented separately from one another. The subarea plan for the County's jurisdiction covers 252,132 acres in the southwestern portion of the unincorporated lands. The County Subarea Plan is regulated by the Biological Mitigation Ordinance, which outlines the specific criteria and requirements for projects within the MSCP boundaries. The County Subarea Plan (adopted October 1997), the BMO (adopted March 1998), the Final MSCP Plan (dated August 1998) and the Implementation Agreement (signed March 1998) between the County and Wildlife Agencies are the documents used to implement the MSCP.

The MSCP and BMO provide specific criteria for project design, impact allowances and mitigation requirements. The criteria contained within this document do not replace those required by the MSCP. All projects within the MSCP boundaries must conform to both the MSCP requirements and the County's policies under CEQA.

**Resource Protection Ordinance** [County of San Diego, Resource Protection Ordinance, 1991 (Ord. Nos. 7968, 7739, 7685 and 7631) http://www.sdcounty.ca.gov]
The Resource Protection Ordinance (RPO) was adopted in 1989 and later amended in 1991. RPO restricts to varying degrees impacts to various natural resources including wetlands, wetland buffers, floodplains, steep slopes, sensitive habitat lands and historical sites. Certain permit types are subject to the requirement to prepare Resource Protection Studies under the RPO."

RPO states that no impacts may occur to lands determined to be wetlands as defined by the ordinance, except those impacts related to aquaculture, scientific research and/or wetland restoration projects. In addition, the ordinance requires that a wetland buffer be provided to further protect the wetland resources. Access paths, improvements necessary to protect the adjacent wetlands and those uses allowed within the actual wetland are the only allowed uses within the buffer. No impacts caused by activities other than these specifically mentioned shall be allowed. For more explicit information on these requirements refer to RPO.

RPO also limits impacts to sensitive habitat lands. Sensitive habitat lands include unique vegetation communities and/or the habitat that is either necessary to support a viable population of sensitive species, is critical to the proper functioning of a balanced natural ecosystem or which serves as a functioning wildlife corridor. Impacts shall only be allowed when: (1) all feasible measures have been applied to reduce impacts; and (2) mitigation provides an equal or greater benefit to the affected species.

The ordinance includes the provision that when "the extent of environmentally sensitive lands on a particular legal lot is such that no reasonable economic use of such lot would be permitted by these regulations, then an encroachment into such environmentally sensitive lands to the minimum extent necessary to provide for such reasonable use may be allowed".

**Habitat Loss Permit Ordinance** [County of San Diego, An Ordinance Amending the San Diego County Code to Establish a Process for Issuance of the Coastal Sage Scrub Habitat Loss Permits and Declaring the Urgency Thereof to Take Effect Immediately, Ordinance No. 8365. 1994, Title 8, Div 6, Ch. 1. Sections 86.101-86.105, 87.202.2, www.amlegal.com]
The Habitat Loss Permit (HLP) Ordinance was adopted in March of 1994 in response to both the listing of the California gnatcatcher as a Federally threatened species and the adoption of the Natural Communities Conservation Plan (NCCP) by the State of California. Pursuant to the Special 4(d) Rule under the ESA, the County is authorized to issue "take permits" for the California gnatcatcher (in the form of Habitat Loss Permits) in lieu of Section 7 or 10(a) Permits typically required from the US Fish and Wildlife Service. Although issued by the County, the wildlife agencies must concur with the issuance of a HLP for it to become valid as take authorization under the ESA.

The HLP Ordinance states that projects must obtain a Habitat Loss Permit prior to the issuance of a grading permit, clearing permit or improvement plan if the project will directly or indirectly impact coastal sage scrub habitat (CSS) habitat types. The Ordinance requires an HLP if CSS or related habitat will be impacted, regardless of whether the site is currently occupied by gnatcatchers. HLPs are not required for projects within the boundaries of the Multiple Species Conservation Program since take authorization is conveyed to those projects through compliance with the MSCP. HLPs are also not required for projects that have separately obtained Section 7 or 10(a) permits for take of the gnatcatcher. For more explicit information on these requirements refer to the HLP Ordinance.

## 3.0 TYPICAL ADVERSE EFFECTS

Any action that results in the loss or degradation of a biological resource is considered an adverse effect. The most obvious adverse effect is the direct removal of a resource, such as clearing of habitat or the take of a species. Although not as apparent, indirect impacts can be as harmful as direct impacts. In fact, indirect impacts can adversely affect species or habitat to the extent that it is effectively equivalent to removing the resource.

Significant adverse effects may result from one or more direct, indirect and/or cumulative impacts (CEQA Sections 15358 and 15355). The following describes each of these types of impacts relative to biological resources:

### 3.1 Direct Impacts

Direct impacts are those that are generally obvious, absolute or quantifiable. The removal of habitat from grading or clearing is the most common direct impact. Other examples of direct impacts would include the construction of a substantial barrier in a wildlife corridor (the direct impact being to wildlife movement) or the loss of habitat occupied by a certain species (the direct impact being to that particular species). Direct impacts may occur through the project itself or actions necessary to implement the project (e.g., construction staging areas).

### 3.2 Indirect Impacts

Indirect impacts may be the result of secondary effects from direct impacts or those impacts that over time cause the degradation of a resource by changing its function, health or quality.

Indirect impacts commonly result from a project's edge effects. Edge effects from development may extend several hundred feet into adjacent open space areas, causing significant changes in species composition, diversity and abundance in those lands. Projects can have a wide variety of indirect impacts depending on the type of project, the type of resources present, and the type and degree of edge effects.

Projects can also cause a decline in the availability of a resource, such as water or prey, or change the habitat suitability by altering the moisture level or vegetation present, thereby adversely affecting a biological resource. Indirect impacts have been addressed in multiple species recovery plans, reports, journal articles and conferences. These guidelines were created based on the best available science and most common standards followed by the wildlife agencies, conservationists and biologists. On a case-by-case basis, other measurable standards may apply.

## 3.3 Cumulative Impacts

Cumulative impacts are those caused by the additive effect of multiple direct and indirect impacts to a biological resource. A project's direct and indirect impacts may not be individually significant, but the additive effect when viewed in connection with the impacts of past projects, present and probable future projects may cause the significant loss or degradation of a resource. For instance, a creek may be impacted directly and indirectly from road crossings, buffer encroachment and edge effects, all of which cumulatively cause the overall degradation of the creek.

A project may have significant cumulative effects notwithstanding the project's conformance with a regulatory program or existing mitigation plan such as a Habitat Conservation Plan (HCP) or Natural Communities Conservation Plan (NCCP). For example, species may become listed that were not addressed in the adopted plan, or insufficient information was available at the time of plan adoption.

## 3.4 Permanent and Temporary Impacts

Direct, indirect, and cumulative impacts can be described in more detail relative to whether they are permanent or temporary. Permanent impacts to biological resources would result from a permanent direct loss of those resources as an area is converted to another condition (e.g., developed, ornamental landscaping, etc.), or an indirect impact (e.g., edge effects) that will persist and is permanent as a result of a project.

In some cases, direct impacts may be considered temporary when an area could be restored to its pre-impact condition and would provide habitat and wildlife functions and values effectively equal to the functions and values that existed before it was impacted.

# 4.0 GUIDELINES FOR DETERMINING SIGNIFICANCE

This section provides guidance for evaluating adverse environmental effects a project may have on biological resources. The guidelines for determining significance are organized into five subject areas, based on the California Environmental Quality Act (CEQA) Guidelines. There may be some types of impacts that need to be evaluated under more than one subject area.

These guidelines were established using a variety of resources. Some are the result of an extensive literature search covering scientific texts, journal articles, regional studies and regulatory documents. Others were developed during the creation of the MSCP based on modeling and species analysis. Lastly, where there is no conclusive scientific data to support a specific guideline, it has not been included. Best available science was used in establishing these guidelines, but the guidelines will be modified when scientific evidence to support a new significance guideline becomes available. Any person may provide suitable scientific evidence for consideration in modifying the standards presented in this section and the information shall be considered and applied, as approved by the County. Additional site-specific guidelines may be applied where

relevant circumstances dictate as approved by the County. Please note that due to the extensive list of references and multiple sources for each guideline, all references are listed at the end of this document.

It is important to note that quantification standards are provided as a guidance tool only and specific conditions may vary based on specific site conditions and/or circumstances. Values are provided as a tool for assessing the need to consider the potential for a significant effect to exist and the requirement to specifically address the issues raised in this section.

Before a determination of the significance of an impact can be made, the presence and nature of the biological resources must be established per the County's Biological Survey Guidelines.

**Exceeding any one of the following standards will generally be considered a significant impact related to biology as a result of project implementation, in the absence of scientific evidence to the contrary:**

## 4.1 Special Status Species

**Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?**

The following information should be evaluated to provide evidence to support the conclusion.

A. The project would impact one or more individuals of a species listed as federally or state endangered or threatened. [1]
B. The project would impact the regional long-term survival of a County Group A or B plant species, or a County Group I animal species, or a species listed as a state Species of Special Concern. Impacts of less than 5 percent of an existing population would only be allowable if a biologically-based determination can be made that the project would not have a substantial adverse effect on the regional long-term survival of that plant or animal. Impacts to 5 percent or more of the population are generally considered significant.[2]

[1] Significance guideline 4.1.A. Impacts to federally and/or state listed species are always considered significant.

[2] Significance guidelines 4.1.B, 4.1.C. The County has divided sensitive species into groups based on their rarity and known threats. Plant species are divided into Groups A through D on the County Rare Plant List (Table 1). Animals are divided into Groups I and II on the Sensitive Animal List (Table 2). Groups A and B Plants and Group I Animals include those that have a very high level of sensitivity, either because they are listed as threatened or endangered or because they have very specific natural history requirements that must be met. Groups C and D Plants and Group II Animals include those species that are becoming less common, but are not yet so rare that extirpation or extinction is imminent without immediate action. These species tend to be prolific within their suitable habitat types.

C. The project would impact the regional long-term survival of a County Group C or D plant species or a County Group II animal species.[2]
D. The project may impact arroyo toad aestivation or breeding habitat. Any alteration of suitable habitat within 1 kilometer (3,280 feet) and 80 feet elevation of occupied breeding habitat would only be allowable if a biologically-based determination can be made that the project would not impact the aestivation or breeding behavior of arroyo toads.[3]
E. The project would impact golden eagle habitat. Any alteration of habitat within 4,000 feet of an active golden eagle nest would only be allowable if a biologically-based determination can be made that the project would not have a substantially adverse effect on the regional long-term survival of golden eagle.[4]
F. The project would result in a loss of functional foraging habitat for raptors. Alteration of less than 5 acres of foraging habitat would only be allowable if a biologically-based determination can be made that the project would not have a substantially adverse effect on the regional long term survival of any raptor species.
G. The project would increase noise and/or nighttime lighting to levels proven to adversely affect sensitive species.
H. The project would impact the viability of a core wildlife area, defined as a large block of habitat (typically 500 acres or more) that supports a source population of a sensitive wildlife species or multiple sensitive wildlife species. Alteration of any portion of a core habitat would only be allowable if a biologically-based determination can be made that the project would not have a substantially adverse effect on the regional long-term survival of that/those species.
I. The project would adversely affect sensitive species as a result of increased human access or predation or competition from pets, pests or exotic species. Such indirect impacts would only be allowable if a biologically-based determination can be made that the project would not have a substantially

---

[3] Significance guideline 4.1.D. Arroyo toads breed in wetland areas, but require upland habitats for aestivation (similar to hibernation). Studies have shown that arroyo toads will travel up to 1 kilometer (0.62 miles) from wetlands, but there is no definitive study to show the absolute minimum distance that arroyo toads require for all of their life history needs. The USFWS model used to identify and map areas essential to this species determined that areas up to 25m (80 feet) in elevation above the stream channel were most likely to contain the primary constituent upland habitat elements essential to the species. Until such time that a more definitive study is completed, the County will use a width and elevation most often used by the wildlife agencies and amphibian experts.

[4] Significance guideline 4.1.E. Only a limited number of active golden eagle nests remain in San Diego County. This guideline applies a 4000-foot no-disturbance zone around golden eagle nests. If the project proposes a use that will have little to no long-term effects, such as the construction of a wireless telecommunications facility or improvements to an existing road, the project may proceed with appropriate mitigation during the non-breeding season without having significant effects. Long-term uses within the 4000-foot zone, including most development and recreational uses, are considered significant impacts to golden eagles even if the initial grading, clearing and construction were completed outside of the breeding season. The analysis completed during the creation of the MSCP found the 4000-foot no-disturbance to be necessary for the long-term viability of the existing active nests. Given the lack of any contrary scientific evidence, the County will also use the 4000 zone criteria outside of the MSCP.

adverse effect on the regional long-term survival of the sensitive species.

J. The project would impact nesting success of the following sensitive animals through grading, clearing and/or construction activities. Alteration of habitat during breeding seasons would only be allowable if a biologically-based determination can be made that the project would not have a substantially adverse effect on the regional long-term survival of the specified species:[5]

| *Species** | *Breeding Season* |
|---|---|
| *Coastal cactus wren* | *February 15 to August 15* |
| *Coastal California gnatcatcher** | *February 15 to August 31* |
| *Least Bell's vireo* | *March 15 to September 15* |
| *Southwestern willow flycatcher* | *May 1 to September 1* |
| *Tree-nesting raptors* | *January 15 to July 15* |
| *Ground-dwelling raptors* | *February 1 to July 15* |
| *Golden eagle* | *January 1 to July 31* |

**The breeding seasons listed in this table do not supersede implementing agreements with the wildlife agencies, Habitat Conservation Plans (HCPs), Habitat/Resource Management Plans (HMPs/RMPs), and Special Area Management Plans (SAMPs). For example, inside the MSCP Subarea Plan, the gnatcatcher breeding season is March 1 to August 15.*

## 4.2 Riparian Habitat or Sensitive Natural Community

**Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?**

The following information should be evaluated to provide evidence to support the conclusion.

A. Project-related construction, grading, clearing, construction or other activities would temporarily or permanently remove sensitive native or naturalized habitat (as listed in Table 5, excluding those without a mitigation ratio) on or off the project site. This guideline would not apply to small remnant pockets of habitat that have a demonstrated limited biological value. No de minimus standard is specified under which an impact would not be significant, however; minor impacts to native or naturalized habitat that is providing essentially no biological habitat or wildlife value can be evaluated on a case-by-case basis to determine whether the projected impact may be less than significant. For example, an impact to native or naturalized upland habitat under 0.1 acre in an existing urban setting may be considered less than significant (depending on a number of factors). An evaluation of this type should consider factors including, but not

[5] Significance guideline 4.1.J. This guideline addresses the potential loss of offspring for particularly sensitive birds. Any direct or indirect impacts that might affect the nesting success of these species would be significant. The dates used are based on the collective information gathered from various studies completed on the birds of San Diego County.

limited to, type of habitat, relative presence of habitat type in project vicinity, its condition and size, presence or potential for sensitive plant species, relative connectivity with other native habitat, wildlife species and activity in project vicinity, and current degree of urbanization and edge effects in project vicinity, etc. Just because a particular habitat area is isolated, for example, does not necessarily mean that impacts to the area would not be significant (e.g. vernal pools). An area that is disturbed or partially developed may provide a habitat "island" that would serve as a functional refuge area "stepping stone" for migratory species.

B. Any of the following will occur to or within jurisdictional wetlands and riparian habitats as defined by ACOE, CDFG and the County of San Diego: removal of associated vegetation; grading; obstruction or diversion of water flow; adverse change in velocity or siltation rate; placement of fill; placement of structures; construction of a road crossing; placement of culverts or other underground piping; any disturbance of the substratum; and/or any activity that may cause an adverse change in native species composition, diversity and abundance.

C. The project would draw down the groundwater table 3 feet or more from historical groundwater levels to the detriment of groundwater-dependent habitat.[6]

D. The project does not include a wetland buffer adequate to protect on-site wetlands. Generally, the County presumes buffers of a minimum of 25 feet and a maximum of 200 feet are necessary to protect wetlands. The following examples provide guidance on determining appropriate buffer widths.[7]

- A 25-foot wetland buffer would only be appropriate under a situation such as the following: The wetland has been assessed to have low physical and chemical functions, soils are not highly erosive, slopes do not exceed 25%, and the wetland is not essential or integral in maintenance of local ecological values.
- A wetland buffer of 50-100 feet would be appropriate for moderate to high quality wetlands which support hydrophytic vegetation or wetlands within steep slope areas with highly erosive soils. Within the 50-100-foot range, wider buffers are appropriate where wetlands connect upstream and downstream, where the wetlands serve as a local wildlife corridor, or where the adjacent land use(s) would result in substantial edge effects that could not be mitigated.

[6] Significance guideline 4.2.C. Studies have found that groundwater reductions adversely affect native plant species. Two of the referenced studies (Integrated Urban Forestry, 2001 and Committee on Riparian Zone Functioning and Strategies for Management et. al, 2002) found that permanent reduction in groundwater elevation levels of greater than three feet is enough to induce water stress in some riparian trees, particularly willow (*Salix* spp.), cottonwood (*Populus* spp.) and *Baccharis* species.

[7] Significance guidelines 4.2.D, 4.5 C. The Resource Protection Ordinance substantially limits activities that may occur in wetlands and wetland buffers as defined by the Ordinance. The Ordinance requires wetland buffers of an appropriate size to protect the wetlands environmental and functional habitat values. The Ordinance prohibits impacts to sensitive habitat lands, although it allows development within sensitive habitat lands when the project includes mitigation that provides an equal or greater benefit to the affected species.

- Wetland buffers of greater than 100 feet but less than 200 feet are appropriate for wetlands within regional wildlife corridors or wetlands that support significant populations of wetland-associated sensitive species or where stream meander, erosion, or other physical factors indicate a wider buffer is necessary to preserve wildlife habitat.
- Buffering of greater than 200 feet may be necessary when a wetland is within a regional corridor or supports significant populations of wetland-associated sensitive species and lies adjacent to land use(s) which could result in a high degree of edge effects within the buffer.
- Wetlands that do not provide significant wildlife habitat or would not suffer substantial adverse effects (as referenced above) due to the type and extent of adjacent uses proposed may not require a full 25-foot buffer.

## 4.3 Federal Wetlands

**Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?**

A. Refer to Section 4.2 guidelines.

## 4.4 Wildlife Movement and Nursery Sites

**Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?**

The following information should be evaluated to provide evidence to support the conclusion.

A. The project would prevent wildlife access to foraging habitat, breeding habitat, water sources, or other areas necessary for their reproduction.
B. The project eliminates connectivity between blocks of habitat, or would potentially block or substantially interfere with a local or regional wildlife corridor or linkage. For example, if the project proposes roads that cross corridors, fencing that channels wildlife to underpasses located away from interchanges will be required to provide connectivity. Wildlife underpasses shall have dimensions (length, width, height) suitable for passage by the affected species based on a site-specific analysis of wildlife movement.[8]
C. The project would create artificial wildlife corridors that do not follow natural movement patterns. For example, constraining a corridor for mule deer or mountain lion to an area that is not well-vegetated or that runs along the face of a steep slope instead of through the valley or along the ridgeline.[8]

D. The project would increase noise and/or nighttime lighting in a wildlife corridor or linkage to levels proven to affect the behavior of the animals identified in a site-specific analysis of wildlife movement.[8]

E. The project does not maintain an adequate width for an existing wildlife corridor or linkage and/or would further constrain an already narrow corridor through activities such as (but not limited to) reduction of corridor width, removal of available vegetative cover, placement of incompatible uses adjacent to it, and placement of barriers in the movement path. The adequacy of the width shall be based on the biological information for the target species, the quality of the habitat within and adjacent to the corridor, topography and adjacent land uses. Where there is limited topographic relief, the corridor should be well-vegetated and adequately buffered from adjacent development. Corridors for bobcats, deer and other large animals should reach rim-to-rim along drainages.[8]

F. The project does not maintain adequate visual continuity (i.e., long lines-of-site) within wildlife corridors or linkage. For example, development (such as homes or structures) sited along the rim of a corridor could present a visual barrier to wildlife movement. For stepping-stone corridors, a project does not maintain visual continuity between habitat patches.[8]

## 4.5 Local Policies, Ordinances, Adopted Plans

**Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?**

The following information should be evaluated to provide evidence to support the conclusion.

A. The project would impact coastal sage scrub (CSS) vegetation in excess of the County's 5% habitat loss threshold as defined by the Southern California Coastal Sage Scrub Natural Communities Conservation Planning Process (NCCP) Guidelines.[9]

[8] Significance guidelines 4.4.B, 4.4.C, 4.4.D, 4.4.E, 4.4.F. Wildlife movement paths have a critical role in species survival, allowing foraging, juvenile dispersal, genetic flow, migration and colonization. Without these ecological processes, the probability of species extirpation and eventually extinction is significantly greater. Because of their importance, movement paths have received substantial attention in conservation biology literature. Unfortunately, no study has or can conclude the universal minimum standards for maintaining a movement path because of inherent variability in biological resources. Instead, the optimal conditions for individual movement paths is be based on site-specific factors, such as the function of the movement path (i.e., as either a regional linkage or a local movement corridor), the needs of the specific species that utilize the path and the type and quality of habitat present. The criterion set forth in these guidelines relies on site-specific factors while following the guiding principles that have been established through the numerous studies on wildlife movement paths.

B. The project would preclude or prevent the preparation of the subregional Natural Communities Conservation Planning Process (NCCP). For example, the project proposes development within areas that have been identified by the County or resource agencies as critical to future habitat preserves.[9]
C. The project will impact any amount of sensitive habitat lands as outlined in the Resource Protection Ordinance (RPO).[7]
D. The project would not minimize and/or mitigate coastal sage scrub habitat loss in accordance with Section 4.3 of the Natural Communities Conservation Planning Process (NCCP) Guidelines.[9]
E. The project does not conform to the goals and requirements as outlined in any applicable Habitat Conservation Plan (HCP), Habitat Management Plan (HMP), Special Area Management Plan (SAMP), Watershed Plan, or similar regional planning effort.
F. For lands within the Multiple Species Conservation Program (MSCP), the project would not minimize impacts to Biological Resource Core Areas (BRCAs), as defined in the Biological Mitigation Ordinance (BMO).[10]
G. The project would preclude connectivity between areas of high habitat values, as defined by the Southern California Coastal Sage Scrub Natural Communities Conservation Planning Process (NCCP) Guidelines.[9]
H. The project does not maintain existing movement corridors and/or habitat linkages as defined by the Biological Mitigation Ordinance (BMO).[10]
I. The project does not avoid impacts to MSCP narrow endemic species and would impact core populations of narrow endemics.[10]
J. The project would reduce the likelihood of survival and recovery of listed species in the wild.[9]
K. The project would result in the killing of migratory birds or destruction of active migratory bird nests and/or eggs (Migratory Bird Treaty Act).
L. The project would result in the take of eagles, eagle eggs or any part of an eagle (Bald and Golden Eagle Protection Act).

[9] Significance guidelines 4.5.A, 4.5.B, 4.5.D, 4.5.G, 4.5.J. Projects must conform to the specific requirements of the Southern California Coastal Sage Scrub Natural Communities Conservation Planning Process (NCCP) Guidelines and the San Diego County Habitat Loss Permit (HLP) Ordinance. These guidelines relate to specific findings required for all projects outside of the MSCP boundaries that will affect coastal sage scrub.

[10] Significance guidelines 4.5.F, 4.5.H, 4.5.I. Projects must conform to the specific requirements of the Multiple Species Conservation Program (MSCP) and the Biological Mitigation Ordinance (BMO). These guidelines relate to specific findings required for all projects within the MSCP boundaries.

## 5.0 STANDARD MITIGATION AND PROJECT DESIGN CONSIDERATIONS

When it has been established that a significant impact will potentially occur, the project must propose mitigation to lessen or compensate for the impact. As defined by CEQA (Section 15370), mitigation includes either measures to avoid, minimize or rectify impacts or measures that compensate for impacts by replacing or providing substitute resources. Table 1 provides a grouping of some applicable mitigation measures that can be utilized to address the Significance Guidelines.

Project design is critically important for the protection of biological resources. Unless projects are designed appropriately, resources cannot be protected in a manner that will ensure long-term viability. Detailed discussion regarding project design is included in Attachment B.

**Table 1**

**Typical Mitigation Measures**

| Typical Mitigation Applied to Reduce Effects Below Significance |
|---|
| Biological Open Space/Conservation Easement or Fee Title Transfer of Open Space |
| Limited Building Zone Easement |
| Off-site Purchase or Preservation of Habitat |
| Revegetation Plans |
| Root Stock, Seed or Specimen Collection |
| Revegetation and/or enhancement of Open Space |
| Resource Management Plans (RMP) |
| Breeding Season Avoidance |
| Permanent Signs |
| Permanent Fencing or Walls |
| Temporary Fencing |
| Evidence of Federal or State permits |
| Restrictions on Lighting and/or Noise |
| Biological Monitoring |

## 6.0 REFERENCES

Although specific references are not cited in the text of this document, the following resources were consulted to create these significance guidelines.


Allen, E.B., S.A. Eliason, V.J. Marquez, G.P. Schultz, N.K. Storms, C.D. Stylinski, T.A. Zink and M.F. Allen
What are the limits to restoration of coastal sage scrub in southern California. Pages 253-262 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Anderson, B.W., R.D. Ohmart and H.A. Allen Jr.
Riparian birds in the riparian/agricultural interface. Pages 190-195 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Avery, M, P.F. Springer and J.F. Cassel
The effects of tall tower on nocturnal bird migration - a portable ceilometer study. The Auk 93: 281-291, 1976.

Axelrod, D.I.
The origin of coastal sage vegetation, Alta and Baja California. Amer. J. Bot. 65(10): 1117-1131, 1978.

Outline history of California vegetation. Pages 139-194 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Bakker. E.S.
An Island Called California: An Ecological Introduction to its Natural Communities. University of California Press, Berkeley and Los Angeles, California, 1971.

Bauder, E.T. and S. McMillan
Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico. Pages 56-70 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Beauchamp, R.M.
A Flora of San Diego County, California. Sweetwater River Press, National City, California, 1986.

Beier, P.
Determining minimum habitat areas and habitat corridors for cougars. Conservation Biology 7(1): 94-108, 1993.

Beier, P. and S. Loe
A checklist for evaluating impacts to wildlife movement corridors. Wildlife Society Bulletin 20:434-440, 1992.

Bender, D.J., T. A. Contreras and L. Fahrig
Habitat loss and population decline: a meta-analysis of the patch size effect. Ecology 79(2): 517-533, 1998.

Bennett, A.F.
Linkages in the Landscape: the Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland and Cambridge, UK., 1998.

Bingham, B.B. and B.R. Noon
Mitigation of habitat "take": application to habitat conservation planning. Conservation Biology 11(1): 127-139, 1997.

Black, C. and P.H. Zedler
An overview of 15 years of vernal pool restoration and construction activities in San Diego County, California. Pages 195-205 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Bock, C.E., K.T. Vierling, S.L. Haire, J.D. Boone and W.W. Merkle
Patterns of rodent abundance on open-space grasslands in relation to suburban edges. Conservation Biology 16(6): 1653-1658, 2002.

Bolger, D.T., A.V. Suarez, K.R. Crooks, S.A. Morrison and T.J. Case.

Arthropods in urban habitat fragments in southern California: area, age and edge effects. Ecological Applications 10(4): 1230-1248, 2000.

Bowler, P.A., K.B. Pierce Jr., V. Beauchamp and T. Tabshouri
Translocation and grafting of adult coastal cholla (Opuntia prolifera) and coastal prickly pear (Opuntia littoralis) as mitigation for cactus wren habitat loss in burned areas. Pages 271-273 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Brode, J.M. and R.B. Bury
The importance of riparian systems to amphibians and reptiles. Pages 30-36 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Bruderer, B., D. Peter and T. Steuri
Behaviour of migrating birds exposed to x-band radar and a bright light beam. J. Experimental Biology 202: 1015-1022, 1999.

Burbrink, F.T., C.A. Phillips and E.J. Heske
A riparian zone in southern Illinois as a potential dispersal corridor for reptiles and amphibians. Biological Conservation 86: 107-115, 1998.

Burger, J.C., R.A. Redak, E.B. Allen, J.T. Rotenberry and M.F. Allen
Restoring arthropod communities in coastal sage scrub. Conservation Biology 17(2): 460-467, 2003.

California Code of Regulations
Guidelines for Implementation of CEQA, Appendix G, Title 14, Chapter 3, §15000-15387.

California Department of Fish and Game (CDFG)
Southern California Coastal Sage Scrub Natural Community Conservation Planning Process Guidelines. CDFG and California Resources Agency, Sacramento, California, 1993.

California Oak Foundation. Care of California's native oaks, 2002. (online) URL: http://www.californiaoaks.org/html/oak_tree_care.html.

California Public Resources Code
California Environmental Quality Act (PRC §21000-21178).

Campbell, K.F., R.A. Erickson, W.E. Haas and M.A. Patten
California gnatcatcher use of habitats other than coastal sage scrub: conservation and management implications. Western Birds 29: 421-433, 1998.

Castelle, A.J., C. Conolly, M. Emers, E.D. Metz, S. Meyer, M. Witter, S. Mauermann, T. Erickson, S.S. Cooke
Wetland buffers: use and effectiveness. Adolfson Associates, Inc. Shorelands and Coastal Zone Management Program, Washington Department of Ecology, Olympia, Pub. No. 92-10, 1992.

Chase, M.K., W.B. Kristan III, A.J. Lynam, M.V. Price and J.T. Rotenberry
Single species as indicators of species richness and composition in California coastal sage scrub birds and small mammals. Conservation Biology 14(2): 474-487, 2000.

Clevenger, A.P. and N. Waltho
Factors influencing the effectiveness of wildlife underpasses in Banff National Park, Alberta, Canada. Conservation Biology 14(1): 47-56, 2000.

Committee on Riparian Zone Functioning and Strategies for Management, Water Science and Technology Board, Board on Environmental Studies and Toxicology, Division on Earth and Life Studies, National Research Council
Riparian Areas: Functions and Strategies for Management. National Academy Press, 2002. [http://www.nap.edu/catalog/10327.html#orgs]

Conservation Biology Institute
Review of potential edge effects on the San Fernando Valley spineflower (Chorizanthe parryi var. fernandina). Unpublished report, 2000.

Cooke, S.S.
Wetland Buffers: Use and Effectiveness APPENDICES. Pentec Environmental Inc., Washington State Department of Ecology, Olympia, Pub. No. 92-10, 1992.

County of San Diego
An Ordinance Amending the San Diego County Code to Establish a Process for

Issuance of the Coastal Sage Scrub Habitat Loss Permits and Declaring the Urgency Thereof to Take Effect Immediately, Ordinance No. 8365, 1994.

Biological Mitigation Ordinance, Ord. Nos. 8845, 9246, 1998.

Implementing Agreement by and between United States Fish and Wildlife Service, California Department of Fish and Game and County of San Diego. County of San Diego, Multiple Species Conservation Program, 1998.

Multiple Species Conservation Program, County of San Diego Subarea Plan, 1997.

Resource Protection Ordinance, compilation of Ord.Nos. 7968, 7739, 7685 and 7631, 1991.

Wildland/Urban Interface Ordinance, Ord. No. 9111, 2000.

Crooks, K.

Mammalian carnivores as target species for conservation in southern California. Pages 105-112 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Relative sensitivities of mammalian carnivores to habitat fragmentation. Conservation Biology 16(2): 488-502, 2002.

Dagit, R.

Post-fire monitoring of coast live oaks (Quercus agrifolia) burned in the 1993 Old Topanga Fire. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Survival of transplanted coast live oaks (Quercus agrifolia)in southern California. Pages 275-279 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Dagit, R. and A.J. Downer

To prune or not to prune: responses of coast live oaks (Quercus agrifolia) to canopy retention during transplanting. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Dahl, T.E.

Status and trends of wetlands in the coterminus United States 1986 to 1997. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 82 pp. , 2000.

Debinski, D.M. and R.D. Holt

A survey and overview of habitat fragmentation experiments. Conservation Biology 14(2): 342-355, 2000.

Dobson, A.P., J.P. Rodriquez, W.M. Roberts and D.S. Wilcove

Geographic distribution of endangered species in the United States. Science 275:550-553, 1997.

Dodd Jr., C.K. and B.S. Cade

Movement patterns and the conservation of amphibians breeding in small, temporary wetlands. Conservation Biology 12(2): 331-339, 1998.

Donovan, T.M., F.R. Thompson III, J. Faaborg and J.R. Probst

Reproductive success of migratory birds in habitat sources and sinks. Conservation Biology 9(6): 1380-1395, 1995.

Donovan. T.M., P.W. Jones, E.M. Annand and F.R. Thompson III

Variation in local-scale edge effects: mechanisms and landscape context. Ecology 78(7): 2064-2075, 1997.

Duerksen, C.J. and S. Richman

Tree Conservation Ordinances. American Planning Association, Chicago, Illinois, 1993.

Dunning Jr., J.B., R. Borgella Jr., K. Clements and G.K. Meffe

Patch isolation, corridor effects and colonization by a resident sparrow in a managed pine woodland. Conservation Biology 9(3): 542-550, 1995.

Emmons & Olivier Resources

Benefits of wetland buffers: a study of functions, values and size. Report prepared for Minnehaha Creek Watershed District, Minnesota, 2001.

Environmental Laboratory
Corps of Engineers Wetlands Delineation Manaul. U.S. Army Corps of Engineers, Wetlands Research Program Technical Report Y-87-1, 1987.

Faber, P., E. Keller, A. Sands and B. Massey
The Ecology of Riparian Habitat of the Southern California Coastal Region: A Community Profile. Biological Report 85(7.27), U.S. Department of the Interior, Fish and Wildlife Service, Research and Development, National Wetlands Research Center, Washington, DC. 1989.

Fahrig, L.
Relative effects of habitat loss and fragmentation on population extinction. J. Wildlife Management 61(3): 603-610, 1997.

Federal Interagency Stream Restoration Working Group
Stream corridor restoration: principles, processes and practices. FISRWG, GPO Item No. 0120-A; SuDocs No. A 57.6/2:EN3/PT.653; Part 653 of National Engineering Handbook, USDA - Natural Resources Conservation Service, 1998 (revised 2001).

Findlay, C.S. and J. Bourdages
Response time of wetland biodiversity to road construction on adjacent lands. Conservation Biology 14(1): 86-94, 2000.

Fischer, R.A.
Width of riparian zones for birds. EMRRP Technical Notes Collection (TN EMRRP-SI-09), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army/mil/el/emrrp, 2000.

Fisher, R.N. and T.J. Case
Distribution of the herpetofauna of coastal southern California with reference to elevation effects. Pages 137-143 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Fisher, R.N., A.V. Suarez and T.J. Case
Spatial patterns in the abundance of the coastal horned lizard. Conservation Biology 16(1): 205-215, 2002.

Fry, D.L.
Effects of a prescribed fire on oak woodland stand structure. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Fugate, M.
Branchinecta of North America: population structure and its implications for conservation practice. Pages 140-146 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Gelbard, J.L. and J. Belnap
Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology 17(2): 420-432, 2003.

Giusti, G., T. Scott, B. Garrison and K. Shaffer
Pages 34-50 in P. Tinnin, editor. Guidelines for Managing California's Hardwood Rangelands. University of California Division of Agriculture & Natural Resources Publication 3368, 1996.

Giusti, G.A. and P.J. Tinnin (eds)
A Planner's Guide for Oak Woodlands. Publication of the Integrated Hardwood Range Management Program. Department of Forestry and Resource Management, University of California, Berkeley, 1993.

Goguen, C.B. and N.E. Mathews
Local gradients of cowbird abundance and parasitism relative to livestock grazing in a western landscape. Conservation Biology 14(6): 1862-1869, 2000.

Goldingay, R.L., P.A. Kelly and D.F. Williams
The kangaroo rats of California: endemism and conservation of keystone species. Pacific Conservation Biology 3:47-60, 1997.

Gray, M.V. and J.M. Greaves

Riparian forest as habitat for the least Bell's vireo. Pages 605-611 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Griffin, J.R.
Oak woodland. Pages 383-416 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Haddad, N.
Corridor length and patch colonization by a butterfly, Junonia coenia. Conservation Biology 14(3): 738-745, 2000.

Hall, L.S., P.R. Krausman and M.L. Morrison
The habitat concept and a plea for standard terminology. Wildlife Society Bulletin 25(1): 173-182, 1997.

Hanes, T.L. Chaparral. Pages 417-470 in M.G. Barbour and J. Major, eds.
Terrestrial Vegetation of California. California Native Plant Society, 1995.

Harris, L.D. and P.B. Gallagher
New initiatives for wildlife conservation: the need for movement corridors. Pages 11-34 in G. Mackintosh, editor. In Defense of Wildlife: Preserving Communities & Corridors.Defenders of Wildlife, Washington, DC. 1989.

Harris, R.R. and S.D. Kocher
Oak management by County jurisdictions in the central Sierra Nevada, California. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Heady, H.F.
Valley grassland. Pages 491-514 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Herson-Jones, L.M., M. Heraty and B. Jordan
Environmental Land Planning (ELP) Series: Riparian Buffer Strategies for Urban Stream Protection. Urban Watershed Planning Section, Department of Environmental Programs, Metropolitan Washington Council of Governments, Washington, D.C., 1995.

Hickman, J.
The Jepson Manual. University of California Press, Berkeley and Los Angeles, California, 1993.

Hobbs, R.J. and L.F. Huenneke
Disturbance, diversity and invasion: implications for conservation. Conservation Biology 6(3): 324-337, 1992.

Hogan, D.C., J.O. Sawyer and C. Saunders
Southern maritime chaparral. Fremontia 24(4):3-7, 1996.

Holland, D.C. and R.H. Goodman Jr.
A Guide to the Amphibians and Reptiles of MCB Camp Pendleton. Resource Management Division, MCB Camp Pendleton, California, 1998.

Holland, R.F. and S.K. Jain
Vernal pools. Pages 515-536 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Holland, R.R.
Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, Resources Agency, Department of Fish and Game, Sacramento, California, 1986.

Integrated Urban Forestry
Adaptability of native plant species to groundwater fluctuations for Sycamore Ranch. Laguna Hills, California, 2001.

Jones, B.E.
A State Mandate for Riparian Wetland System Preservation. Pages 826-832 in California Riparian Systems Conference September 17-19, 1981.

Keeley, J.E. and P.H. Zedler
Characterization and global distribution of vernal pools. Pages 1-14 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

King, J.L.

Loss of diversity as a consequence of habitat destruction in California vernal pools. Pages 119-123 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Kirchner, F., J.B. Ferdy, C. Andalo, B. Colas and J. Moret
Role of corridors in plant dispersal: an example with the endangered Ranunculus nodiflorus. Conservation Biology 17(2): 401-410, 2003.

Knight. A.W. and R.L. Bottorff
The importance of riparian vegetation to stream ecosystems. Pages 160-167 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Krebs, C.J.
Ecological Methodology. HarperCollins Pubishers, Inc., New York, NY, 1989.

Kruess, A. and T. Tscharntke
Grazing intensity and the diversity of grasshoppers, butterflies and trap-nesting bees and wasps. Conservation Biology 16(6): 1570-1580, 2002.

Lamberson, R.H., B.R. Noon, C. Voss and K.S. McKelvey
Reserve design for territorial species: the effects of patch size and spacing on the viability of the northern spotted owl. Conservation Biology 8(1): 185-195, 1994.

Leidy, R.A. and E.G. White
Toward an ecosystem approach to vernal pool compensation and conservation. Pages 263-273 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Leven, A.A.
Riparian Area Management in the Pactifi Southwest Region of the Forest Service. Pages 800-807 in California Riparian Systems Conference September 17-19, 1981.

MacArthur, R.H. and E.O.Wilson
The theory of island biogeography. Princeton University Press, Princeton, New Jersey, USA, 1967.

Machtans, C.S., M.A. Villard and S.J. Hannon
Use of riparian buffer strips as movement corridors by forest birds. Conservation Biology 10(5): 1366-1379, 1996.

Mahoney, D.L. and D.C. Erman
The role of streamside bufferstrips in the ecology of aquatic biota. Pages 168-176 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Major, J.
California climate in relation to vegetation. Pages 11-74 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Marzluff, J.M., F.R. Gehlbach and D.A. Manuwal
Urban environments: influences on avifauna and challenges for the avian conservationist. Pages 283-299 in J.M. Marzluff and R. Sallabanks, eds. Avian Conservation: Research and Management. Island Press, Washington, D.C., 1998.

Meents, J.K., B.W. Anderson and R.D. Ohmart
Sensitivity of riparian birds to habitat loss. Pages 619-625 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management. University of California Press, Berkeley, California, 1984.

Mills, L.S. and M.E. Soule
The keystone-species concept in ecology and conservation. Bioscience 43(4): 219-225, 1993.

Montalvo, A.M. and N.C. Ellstrand
Transplantation of the subshrub Lotus scoparius: testing of the home-sizte advantage hypothesis. Conservation Biology 14(4): 1034-1045, 2000.

Mooney, H.A.
Southern coastal scrub. Pages 471-490 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Myers, N., R.A. Mittermeier, C.G. Mittermeier, G.A.B. da Fonseca and J. Kent
Biodiversity hotspots for conservation priorities. Nature 403:853-858, 2000.

Naeem, S., L.J. Thompson, S.P. Lawler, J.H. Lawton and R.M. Woodfin
Declining biodiversity can alter the performance of ecosystems. Nature 368: 734-737, 1994.

Narog, M.G., J.L. Beyers, T.E. Paysen and B.M. Corcoran
Recovery of coastal sage shrub species after mechanical disturbance. Pages 263-269 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

National Audubon Society
Field Guide to Reptiles and Amphibians, North America. Chanticleer Press, Inc., New York, NY, 1979.

Field Guide to Trees, Western Region. Chanticleer Press, Inc., New York, NY, 1980.

Field Guide to North American Birds, Western Region. Chanticleer Press, Inc. New York, NY, 1984.

Field Guide to Mammals, North America. Chanticleer Press, Inc., New York, NY, 1996.

Nature Conservancy
Species Management Abstract: Northern Harrier. The Nature Conservancy, Arlington, Virginia, 1998.

Species Management Abstract: Red-shouldered Hawk. The Nature Conservancy, Arlington, Virginia, 1999.

Nixon, K.C.
The oak (Quercus) biodiversity of California and adjacent regions. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Noss, R.F. and J.M. Scott
Ecosystem protection and restoration: the core of ecosystem management. Pages 239-264 in M.S. Boyce and A. Haney, eds. Ecosystem Management: Applications for Sustainable Forest and Wildlife Resources. Yale University Press, New Haven, Connecticut, 1997.

Noss, R.F.
Indicators for monitoring biodiversity: a hierarchical approach. Conservation Biology 4(4): 355-364, 1990.

Oberbauer, T.A. and J.M. Vanderwier
The vegetation and geological substrate association and its effect on development in southern California. Pages203-212 in P.L. Abbott and W.J. Elliott, eds. Environmental Perils San Diego Region. Geological Society of America Annual Meeting, San Diego Association of Geologists, Comet Printing Service, Santa Fe Spring, California, 1991.

Odell, E.A., D.M. Theobald and R.L. Knight
Incorporating ecology into land use planning. J. American Planning Association 69(1): 72-82, 2003.

Parks, S.A. and A.H. Harcourt
Reserve size, local human density and mammalian extinctions in U.S. protected areas. Conservation Biology 16(3): 800-808, 2002.

Pavlik, B.M., P.C. Muick, S.G. Johnson and M. Popper
Oaks of California. California Oak Foundation, Cachuma Press, Inc., Los Olivos, California, 1991.

Penrod, K.
Missing Linkages: Restoring Connectivity to the California Landscape. Proceedings from Missing Linkages November 2, 2000 conference cosponsored by California Wilderness Coalition, The Nature Conservancy, the Biological Resources Division of the U.S. Geological Survey, the Center for Reproduction of Endangered Species and California State Parks, 2000.

Platts, W.S.
Riparian system/livestock grazing interaction research in the intermountain west. Pages 424-429 in R.E. Warner and K.M. Hendrix, eds. California Riparian Systems: Ecology, Conservation and Productive Management.

University of California Press, Berkeley, California, 1984.

Preston, K.L., P.J. Mock, M.A. Grishaver, E.A. Bailey and D.F. King
California gnatcatcher territorial behavior. Western Birds 29:242-257, 1998.

Price, M.V. and P.R. Endo
Estimating the distribution and abundance of a cryptic species, Dipodomys stephensi (Rodentia: Heteromyidae), and implications for management. Conservation Biology 3(3): 293-301, 1989.

Price, M.V., P.A. Kelly and R.L. Goldingay
Distances moved by Stephens' kangaroo rat (Dipodomys stephensi merriam) and implications for conservation. J. Mammology 75(4): 929-939, 1994.

Primack, R.B.
Essentials of Conservation Biology. Sinauer Associates, Inc., Sunderland, Massachusetts, 1993.

Raven, P.H.
The California flora. Pages 109-138 in M.G. Barbour and J. Major, eds. Terrestrial Vegetation of California. California Native Plant Society, 1995.

Richardson, C.T. and C.K. Miller
Recommendations for protecting raptors from human disturbance: a review. Wildlife Society Bulletin 25(3):634-638, 1997.

Rieser, C.H.
Rare Plants of San Diego County. Aquafir Press, Imperial Beach, California, 2001.

Riley, S.P.D., R.M. Sauvajot, T.K. Fuller, E.C. York, D.A. Kamradt, C. Bromley and R.K. Wayne
Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California. Conservation Biology 17(2): 566-576, 2003.

Roberts Jr., F.M.
Illustrated Guide to the Oaks of the Southern Californian Floristic Province. F.M. Roberts Publications, Encinitas, California, 1995.

Rosenberg, D.K. and B.R. Noon
Biological corridors: form, function and efficacy. Bioscience 47(10): 677-688, 1997.

Rundel, P.W.
Alien species in the flora and vegetation of the Santa Monica Mountains, California: patterns, processes and management implications. Pages 145-152 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

San Diego Association of Governments
Draft Comprehensive Species Management Plan for the Least Bell's Vireo. RECON, San Diego, California, 1990.

Saunders, D.A., R.J. Hobbs and C.R. Margules
Biological consequences of ecosystem fragmentation: a review. Conservation Biology 5(1): 18-32, 1991.

Schiffman, P.M.
Mammal burrowing, erratic rainfall and the annual lifestyle in the California prairie: is it time for a Paradigm shift? Pages 153-160 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Schueler, T.R. and H.K. Holland, eds.
The Practice of Watershed Protection. Center for Watershed Protection, Ellicott City, MD, 2000.

Shafer, C.L.
Values and shortcomings of small reserves. Bioscience 45(2): 80-90, 1995.

Sibley, D.A.
National Audobon Society, The Sibley Guide to Birds. Chanticleer Press, Inc., New York, NY, 2000.

Simovich. M.A.
Crustacean biodiversity and endemism in California's ephemeral wetlands. Pages 107-118 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Snodgrass, J.W., M.J. Komoroski, A. L. Bryan Jr. and J. Burger

Relationships among isolated wetland size, hydroperiod, and amphibian species richness: implications for wetland regulations. Conservation Biology 14(2): 414-419, 2000.

Soule, M.E.
Land use planning and wildlife maintenance: guidelines for conserving wildlife in an urban landscape. J. American Planning Association 57(3):313-323, 1991.

Soule, M.E., A.C. Alberts and D.T. Bolger
The effects of habitat fragmentation on chaparral plants and vertebrates. Oikos 63:39-47, 1992.

Soule, M.E., D.T. Bolger, A.C. Alberts, J. Wright, M. Sorice and S. Hill
Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. Conservation Biology 2(1): 75-92, 1988.

Southern Orange County NCCP Science Advisors
Principles of reserve design, species conservation and adaptive management for the proposed southern Orange County NCCP. Unpublished, 1997.

Spackman, S.C. and J.W. Hughes
Assessment of minimum stream corridor width for biological conservation: species richness and distribution along mid-order streams in Vermont, USA. Biological Conservation 71: 325-332, 1995.

Stacey, P.B. and M. Taper
Environmental variation and the persistence of small populations. Ecological Applications 2(1): 18-29, 1992.

Stamps, J.A., M. Buechner and V.V. Krishnan
The effects of edge permeability and habitat geometry on emigration from patches of habitat. The American Naturalist 129(4): 533-552, 1987.
Standiford, R. and T. Adams. Pages 110-114 in P. Tinnin, editor. Guidelines for Managing California's Hardwood Rangelands. University of California Division of Agriculture & Natural Resources Publication 3368, 1996.

Standiford, R.B., D. McCreary and W. Frost
Modeling the effectiveness of tree planting to mitigate habitat loss in blue oak woodlands. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Stewart, R.E. Jr.
Technical Aspects of Wetlands: Wetlands as Bird Habitats. National Water Summary on Wetland Resources, US Geol. Surv. Water Supply Paper 2425, 2001.

Stralberg, D.
Landscape-level urbanization effects on chaparral birds: a Santa Monica Mountains case study. Pages 125-136 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Stralberg, D. and B. Williams
Effects of residential development and landscape composition on the breeding birds of Placer County's foothill oak woodlands. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Sutherland, G.D., A.S. Harestad, K. Price and K.P. Lertzman
Scaling of natal dispersal distances on terrestrial birds and mammals. Conservation Ecology 4(1):16, 2000. (online) URL: http://www.consecol.org/vol4/iss1/art16.

Sutter, G. and R. Francisco
Vernal pool creation in the Sacramento Valley: a review of the issues surrounding its role as a conservation tool. Pages 190-194 in C.W. Witham, E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff, editors. Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California, 1998.

Swarthout, E.C.H. and R.J. Steidle

Experimental effects of hiking on breeding Mexican spotted owls. Conservation Biology 17(1): 307-315, 2003.

Tiner, R.W.
Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification, and Mapping. CRC Press LLC, Boca Raton, Florida, 1999.

Trombulak, S.C. and C.A. Frissell
Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14(1):18-30, 2000.

Tsutsui, N. and A.V. Suarez
The colony structure and population biology of invasive ants. Conservation Biology 17(1): 48-58, 2003.

U.S. Environmental Protection Agency
America's wetlands: our vital link between land and water. Office of Water, Office of Wetlands, Oceans and Watersheds. EPA843-K-95-001, 1995b.

U.S. Fish and Wildlife Service
Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia, 2002.

Environmental Assessment and Land Protection Plan for the Vernal Pools Stewardship Project. Portland, Oregon, 1997.

Vernal Pools of Southern California Recovery Plan. U.S. Department of Interior, Fish and Wildlife Service, Region One, Portland, Oregon., 1998

United States Fish and Wildlife Service and National Marine Fisheries Service.
Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. Department of Interior, Washington, D.C., 1998.

Habitat Conservation Planning Handbook. Department of Interior, Washington, D.C., 1996.

Unitt, P.
The Birds of San Diego County. San Diego Natural History Society, San Diego, California, 1984.

Valone, T.J., M. Meyer, J.H. Brown and R.M. Chews
Timescale of perennial grass recovery in desertified arid grasslands following livestock removal. Conservation Biology 16(4): 995-1002, 2002.

Vitousek, P.M.
Biological invasions and ecosystem processes: towards an integration of population biology and ecosystem studies. Oikos 57: 7-13, 1990.

Vreeland, J.K. and W.D. Tietje
Numerical response of small vertebrates to prescribed fire in a California woodland. Proceedings of the fifth symposium on oak woodlands: oaks in California's changing landscape (Standiford, R.B., McCreary, D., Purcell, K.L., technical coordinators; 2001 October 22-25; San Diego, CA). Gen. Tech. Rep. PSW-GTR-184. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture, 2002.

Wenger, S.
A review of the scientific literature on riparian buffer width, extent and vegetation. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, GA, 1999.

Williams, K.S.
Assessing success of restoration attempts: what can terrestrial arthropods tell us? Pages 237-244 in J.E. Keeley, M. Baer-Keeley and C.J. Fotheringham eds. 2nd Interface Between Ecology and Land Development in California. U.S. Geological Survey Open-File Report 00-62, 2000.

Woodroffe, R. and J.R. Ginsberg
Edge effects and the extinction of populations inside protected areas. Science 280:2126-2128, 1998.

Yanes, M., J.M. Velasco and F. Suarez
Permeability of roads and railways to vertebrates: the importance of culverts. Biological Conservation 71: 217-222, 1995.

Zedler, J.B.
Wetland mitigation. Ecological Applications 6(1): 33-37, 1996.

Zedler, P.H., C.R. Gautier and G.S. McMaster

Vegetation change in response to extreme events: the effect of a short interval between fires in California chaparral and coastal scrub. Ecology 64(4): 809-818, 1983.

Zentner, J.
Protection of Riparian Systems in the California Coastal Zone. Pages 634-640 in California Riparian Systems Conference September 17-19, 1981.

Zink, T.A., M.F. Allen, B. Heindl-Tenhunen and E.B. Allen
The effect of a disturbance corridor on an ecological reserve. Restoration Ecology 3(4):304-310, 1995.

## 7.0 LIST OF PREPARERS AND TECHNICAL REVIEWERS

### 7.1 Primary and Contributing Authors

**County of San Diego**
Christine Stevenson, DPLU, Primary Author
Maggie Loy, Contributing Author
Eric Gibson, DPLU, Contributing Author
Jason Giffen, DPLU, Contributing Author
Donna Beddow, DPLU Contributing Author

**Other Contributors**
Keith Merkel, Merkel & Associates, Inc., Contributing Author

### 7.2 Technical Reviewers

**County of San Diego**
Cathy Cibit, DPLU
Mindy Fogg, DPLU
Megan Hamilton, DPLU
Greg Krzys, DPLU
Bobbie Stephenson, DPLU

**Biological Resources Technical Review Panel, 2006**
Robin Church, RC Biological Consulting, Inc.
Keith Merkel, Merkel & Associates, Inc.
Derek H. Langsford, Ph.D., Helix Environmental Planning, Inc.
Jim Prine, EDAW
Wendy Loeffler, RECON

## Attachment A

## DEFINITIONS

Core Wildlife Area. A large block of habitat (typically 500 acres or more) that supports a source population of a sensitive wildlife species or multiple sensitive wildlife species

Corridor. A specific route that is used for movement and migration of species. A corridor may be different from a "Linkage" because it represents a smaller or more narrow avenue for movement.

Linkage. An area of land which supports or contributes to the long-term movement of wildlife and genetic exchange by providing live-in habitat that connects to other habitat areas.

Native Wildlife Nursery Sites. Sites that contain biological, topographical and physical resources necessary for native wildlife reproductive activities. Examples include, but are not limited to: trees that provide nesting and perching sites for birds, man-made structures that provide breeding sites for owls and/or bats, vegetation cover under which mammals would breed, and soils suitable for small mammal or ground-nesting bird breeding activities.

Population. An interbreeding group of individuals of the same species. The geographical limits of a population should be delineated as most appropriate for that species depending on its mobility, method of reproduction, and known distribution. Proportions of a population shall generally be determined based on the number of individuals; however, area may be appropriate for some species.

Raptor Foraging Habitat. Land that supports a minimum of 5 acres of fallow or open areas with any evidence of foraging potential (i.e., burrows, raptor nests, etc.).

Sensitive Habitat. Land which supports unique vegetation communities, or the habitats of rare or endangered species or sub-species of animals or plants as defined by Section 15380 of the State California Environmental Quality Act (CEQA) Guidelines (14 Cal. Admin. Code Section 15000 et seq.). Sensitive Habitat includes the area which is necessary to support a viable population of any of the above species in perpetuity, or which is critical to the proper functioning of a balanced natural ecosystem or which serves as a functioning wildlife corridor.

Sensitive Plant. Those plants which meet the following criteria as determined by the County and maintained in its list of Sensitive Plant Species:

- Group A = Plants that are rare, threatened or endangered in California and elsewhere; or
- Group B = Plants that are rare, threatened or endangered in California but more common elsewhere; or

- Group C = Plants which may be quite rare, but need more information to determine their true rarity status; or
- Group D = Plants of limited distribution and are uncommon, but not presently rare or endangered.

Sensitive Species.

- Those species that are included on generally accepted and documented lists of plants and animals of Endangered, threatened, candidate or of special concern by the Federal Government or State of California;
- MSCP Rare, Narrow Endemic Animal Species, Narrow Endemic Plant Species, and Sensitive Plant Species as defined above.
- Those species that meet the definition of "Rare or Endangered Species" under Section 15380 of the State CEQA Guidelines.

## Attachment B

## PROJECT DESIGN CONSIDERATIONS

Project design is critically important for the protection of biological resources. Unless projects are designed appropriately, resources cannot be protected in a manner that will ensure long-term viability. Therefore, the type and location of projects should always be designed with the needs of biological resources in mind.

The project should first be reviewed to determine whether on-site open space is needed. **On-site open space should only be included when a site hosts *high to very high* value biological resources. The site's location in relation to off-site resources should also be considered when determining whether on-site open space is needed.** Sites with low biological value should provide any necessary mitigation off-site. Sites with moderate biological value should be analyzed to determine whether site-specific factors dictate that on-site mitigation would be biologically-viable, or whether mitigation should be provided off-site. If it is determined that on-site open space should be included, the optimal size, shape and location of open space should become a primary consideration when designing a project.

To determine the value of a site's biological resources, the following attributes should be considered:

- The sensitivity of the vegetation type;
- Extent of on and off-site habitat connectivity;
- General quality of the habitat as determined by the level of disturbance, range in vegetative structure and species diversity;
- Sensitivity of species present;
- Importance of its biological function, such as being part of a wildlife corridor, functioning as a buffer or being integral to a watershed;
- Physical characteristics, such as topography and soils.

### Basic Principles

The following basic principles should be followed when designing a project that includes on-site open space:

- ❖ In all cases, projects should be designed to minimize impacts to the more sensitive resources and completely avoid those that are very rare or unique.

- ❖ Although the overall size of an open space area is important, long-term viability of the resources depends on other factors as well. Site conditions and project-specific details should be considered, including:

    - The function and value of the habitat (i.e., as a remnant for stepping-stone behavior, etc.);

- The type of habitat present and any design requirements (i.e., a vernal pool has a watershed, oak woodlands and wetlands need a buffer to protect their root systems, etc.);
- Whether wildlife utilize portions of the site for movement (on any scale);
- The types of species utilizing the site for nesting, foraging, movement, etc;
- The nature and scale of the project proposed (for instance, an industrial project will require far different considerations than a subdivision with 20-acre lots);
- Fire clearing and brush management requirements for existing and proposed structures and roads.

❖ Large blocks of habitat are generally better than smaller ones. However, when no alternative exists, there are cases when a small patch of habitat is useful as a stepping-stone through a developed landscape; although, this is only functional for a limited number of avian species.

❖ The shape of open space in relation to development is often as important as size. The intent of any project design should be to create the maximum amount of interior open space with the lowest amount of interface between development and preserved areas – referred to as maximizing the surface area to perimeter ratio. Less perimeter translates to less potential for "edge effects" to degrade the open space.

❖ The shape, size and location of open space should all be planned to create the maximum amount of habitat connectivity between on and off-site areas. Habitat connectivity allows for more wildlife movement and maximizes the amount of resources available to resident wildlife (for nesting, foraging, etc.).

❖ To maintain the ecosystem as a functioning unit, the open space should be located such that it encompasses the natural diversity of type, function and structure of habitats. Natural patterns of habitat associations should also be preserved. For instance, wetlands and their adjacent upland habitats should be preserved together as should the grasslands or low-lying shrublands adjacent to oak woodland.

❖ Linkages and corridors are essential for juvenile dispersal, foraging, migration and genetic exchange, all of which are necessary for maintaining healthy populations. The optimal location and dimensions of each linkage and corridor are dependent upon the types of resources present and the specific needs of species that utilize the movement path. Natural movement paths within a larger block of undisturbed habitat should be protected, as should the existing constrained, sometimes tenuous connections that provide the last link between two patches of habitat. Projects should never propose to create a constricted corridor or further constrain an existing one.

❖ Preserve design may include land subject to past disturbances if the land in its current or restored state would serve a biological function.

## Table 2

## San Diego County Sensitive Plant List

Last Updated June 2004

**LIST A** (Plants rare, threatened or endangered in California and elsewhere)

*Abronia villosa var. aurita*, Foothill sand-verbena -- sandy soils, edges of river valleys, open sage scrub, on Santa Margarita
*Acanthomintha ilicifolia*, San Diego Thornmint [FT][CE][NE] -- vernal pools, grassy areas, chaparral and CSS, clay and gabbro soils
*Ambrosia pumila*, San Diego Ambrosia [FE][NE] -- chaparral, CSS, grasslands, and valley bottoms, often in disturbed areas
*Aphanisma blitoides*, Aphanisma -- coastal bluffs, scrub, and dunes
*Arabis hirshbergiae*, Hirshberg's rockcress -- endemic, east of Cuyamaca Lake, on pebble pavement
*Arctostaphylos glandulosa crassifolia*, Del Mar Manzanita [FE] -- maritime chaparral, sandy
*Arctostaphylos otayensis*, Otay Manzanita -- mixed chaparral on gabbro and metavolcanic rock
*Arctostaphylos rainbowensis*, Rainbow Manzanita -- chaparral, north county inland areas
*Astragalus deanei*, Dean's Milkvetch -- CSS and riparian along Sweetwater and Tiajuana River drainages
*Astragalus douglasii perstrictus*, Jacumba Milkvetch -- desert transition in southern part of County
*Astragalus magdalenae peirsonii*, Pierson's Milkvetch [FE][CE] -- desert dunes
*Astragalus oocarpus*, San Diego Milkvetch -- Lower mountain slopes
*Astragalus pachypus jaegeri*, Jaeger's astragalus -- Near Riverside border, chaparral, cismontane woodlands, CSS, grasslands, sandy or rocky
*Astragalus tener titi*, Coastal Dunes Milkvetch [CE] -- coastal strand
*Atriplex coulteri*, Coastal Saltbush -- desert slopes
*Atriplex pacifica*, South Coast Saltbush -- coastal sandy areas
*Atriplex parishii*, Parish brittlescale -- coastal areas
*Atriplex serenana davidsonii*, Davidson's saltscale -- coastal areas
*Baccharis vanessae*, Encinitas Baccharis [FT][CE][NE] -- coastal mixed chaparral, cental coast & foothills
*Berberis nevinii*, Nevin's Barberry [FE][CE][NE] -- mixed chaparral near North County border, also cismontane woodland, CSS, and riparian scrub, sandy or gravelly
*Brodiaea filifolia*, Thread leaved brodeaia [FT][CE][NE] -- clay soils and near vernal pools, North County
*Brodiaea orcuttii*, Orcutt's brodiaea -- vernal pools and foothill springs
*Calochortus dunnii*, Dunn's mariposa lily [CA rare][NE] -- montane and foothill, gabbro and metavolcanic soils
*Ceanothus cyaneus*, Lakeside ceanothus [NE] -- Lakeside, Crest, Alpine chaparral
*Centromadia (Hemizonia) parryi australis*, Southern tarplant -- Fall flowering in coastal and interior valley bottoms including Ramona
*Centromadia (Hemizonia) pungens laevis*, Smooth tarplant -- Fall flowering in coastal valley bottoms
*Chaenactis carphoclina peirsonii*, Peirson's pincushion flower -- desert slopes near Santa Rosa Mountains
*Chaenactis glabriuscula orcuttiana*, Orcutt's pincushion -- coastal bluffs and dunes
*Chaenactis parishii*, Parish's pincushion flower -- peak tops in the mountains, chaparral, rocky
*Chamaesyce platysperma*, Flat seeded spurge -- sandy desert scrub
*Chorizanthe orcuttiana*, Orcutt's chorizanthe [FE][CE] -- sand soils Torrey Pines State Park and Encinitas
*Chorizanthe parryi fernandina*, San Fernando spine flower -- north coastal valleys (old record may have been misidentified)
*Chorizanthe polygonoides longispina*, Long spined-spine flower -- sandy and clay soils
*Clarkia delicata*, Campo clarkia -- central and southern oak woodlands, chaparral
*Comarostaphylos diversifolia diversifolia*, Summer holly -- coastal and foothill canyons in heavy chaparral

*Cordylanthus maritimus maritimus*, Salt marsh bird's beak [FE][CE] -- coastal salt marsh
*Corethrogyne filaginifolia incana*, San Diego sand aster -- coastal sandy areas
*Corethrogyne filaginifolia linifolia*, San Dieguito sand aster -- north coastal sandy areas
*Cryptantha ganderi*, Gander's cryptantha -- desert dunes
*Cupressus forbesii*, Tecate cypress -- Otay, Tecate, and Guatay Mountains
*Cupressus stephensonii*, Cuyamaca cypress -- west slope of Cuyamaca Peak
*Deinandra (Hemizonia) conjugens*, Otay tarplant [FT][CE][NE] -- grasslands near Otay and Bonita
*Deinandra (Hemizonia) floribunda*, Tecate tarplant -- Fall-flowering in valleys and arroyos in interior, southern chaparral
*Deinandra (Hemizonia) mohavensis*, Mojave tarplant [CE] -- drainages in 3000 ft elevation chaparral, Chihuahua Valley, Palomar Mtn.
*Delphinium hesperium cuyamacae*, Cuyamaca larkspur [CA rare] -- montane meadows
*Downingia concolor brevior*, Cuyamaca downingia [CE] -- Cuyamaca Lake
*Dudleya blochmaniae blochmaniae*, Blochman's dudleya -- Canp Pendleton clay soils and terraces
*Dudleya blochmaniae brevifolia*, Short leaved dudleya [CE][NE] -- sandstone terraces near Torrey Pines and Del Mar
*Dudleya multicaulis*, Many stemmed dudleya -- Camp Pendleton
*Dudleya variegata*, Variegated dudleya [NE] -- coastal mesas, CSS and foothill slopes on rocks, especially metavolcanics
*Dudleya viscida*, Sticky dudleya -- north coastal canyon slopes
*Ericameria cuneata macrocephala*, Laguna Mountain goldenbush -- rocky mountain peaks
*Eriogonum foliosum*, Leafy buckwheat -- sandy montane desert soils
*Eryngium aristulatum parishii*, San Diego button celery [FE][CE] -- vernal pools
*Eryngium pendletonensis*, Pendleton button celery -- vernal pools
*Fremontodendron mexicanum*, Mexican flannelbush [FE][CA rare] -- metavolcanic canyons on Otay and Jamul mountains
*Galium angustifolium borregoense*, Borrego bedstraw [CA rare] -- Palm Canyon
*Galium angustifolium jacinticum*, San Jacinto Mountains bedstraw -- edge of montane meadows, Volcan and Palomar
*Grindelia hirsutula hallii*, Hall's gumplant -- montane grassy and meadow areas
*Hazardia orcuttii*, Orcutt's hazardia [CT] -- CSS near Encinitas
*Heuchera brevistaminea*, Mt. Laguna alumroot -- rocky mountain cliff slopes
*Horkelia cuneata puberula*, Mesa horkelia -- coastal mesas, chaparral, CSS, cismontane woodland, sandy, gravelly
*Horkelia truncata*, Ramona horkelia -- gabbro and metavolcanic foothill slopes and peaks
*Hulsea californica*, San Diego sunflower -- chaparral slopes in montane areas
*Isocoma menziesii decumbens*, Decumbent goldenbush -- CSS
*Lasthenia glabrata coulteri*, Coulter's goldfields -- coastal salt marsh
*Lepechinia cardiophylla*, Heart leaved pitcher sage [NE] -- metavolcanic soils near Mt. Woodson
*Lepechinia ganderi*, Gander's pitcher sage [NE] -- metavolcanic soils, Otay and San Miguel Mountains
*Lepidium flavum felipense*, Borrego peppergrass -- dry lake bottom, Little Blaire Valley
*Lepidium virginicum robinsonii*, Robinson pepper grass -- CSS and grassy areas
*Lessingia glandulifera tomentosa*, Warner Springs lessingia -- valleys near Warner Springs, chaparral, sandy
*Lilium parryi*, Lemon lily -- moist montane meadows
*Limnanthes gracilis parishii*, Cuyamaca meadowfoam [CE] -- montane meadows
*Linanthus floribundus hallii*, Santa Rosa Mtn. Linanthus -- Santa Rosa Mountains
*Linanthus orcuttii*, Orcutt's linanthus -- montane forest openings
*Lotus crassifolius otayensis*, Otay mountain lotus -- top of Otay Mountain
*Lotus haydonii*, Pygmy lotus -- desert canyons, pinyon juniper, rocky
*Lotus nutallianus*, Nuttall's lotus -- south coastal strand and sandy soils
*Lupinus excubitus medius*, Mtn. Springs bush lupine -- eastern edge of County near I-8
*Malacothamnus aboriginum*, Indian valley bush mallow -- montane chaparral
*Mimulus latidens*, Vernal pool monkey flower -- vernal pools
*Monardella hypoleuca lanata*, Felt leaved rock mint -- southern foothill peak tops
*Monardella linoides viminea*, Willowy monardella [FE][CE][NE] -- coastal canyons

*Monardella macrantha hallii*, Hall's monardella -- montane forest
*Monardella nana leptosiphon*, San Felipe monardella -- montane chaparral and conifer forest, near Riverside Border
*Monardella stoneae**, -- in canyons around Otay and Tecate Mountains (recently described as new species, was thought to be M. viminea)
*Muilla clevelandii*, San Diego goldenstar -- coastal mesas and clay soils
*Navarretia fossalis*, Spreading navarretia [FT] -- vernal pools
*Navarretia peninsularis*, Peninsular navarretia -- moist montane areas near Cuyamaca Lake
*Navarretia prostrata*, Prostrate navarretia -- vernal pools on Mirimar
*Nemacaulis denudata denudata*, Coast woolly heads -- sandy coastal areas
*Nolina cismontana*, Chapparal beargrass -- Magee Ridge, Viejas Mtn.
*Nolina interrata*, Dehesa beargrass [CE][NE] -- chaparral and CSS on gabbro soils in Southern foothills
*Opuntia parryi serpentina (Clylindropuntia californica)*, Snake cholla [NE] -- south CSS
*Orcuttia californica**, Orcutt grass [FE][CE] -- large vernal pools in California
*Phacelia stellaris*, Brand's phacelia -- CSS
*Pinus torreyana torreyana*, Torrey pine -- Coastal mixed chaparral at Del Mar
*Poa atropurpurea*, San Bernardino Bluegrass [FE] -- montane meadows
*Pogogyne abramsii*, San Diego mesa mint [FE][CE] -- vernal pools
*Pogogyne nudiuscula*, Otay mesa mint [FE][CE] -- vernal pools in Otay Mesa
*Quercus cedrosensis*, Cedros Island Oak -- south slope of Otay Mountain
*Quercus dumosa*, Nuttall's scrub oak -- maritime chaparral
*Ribes canthariforme*, Morena currant -- moist areas in southern interior chaparral
*Ribes viburnifolium*, Santa Catalina Island currant -- coastal canyons, chaparral, woodlands, Santa Catalina Is, Imperial Beach, Baja
*Rorippa gambellii*, Gambel's watercress [FE][CT] -- montane streams, marshes, lake margins, Julian
*Rubus glaucifolius ganderi*, Cuyamaca raspberry -- montane forest near Cuyamaca
*Satureja chandleri*, San Miguel savory -- gabbro and metavolcanic soils in interior foothills, Jamul/Dulzura and Fallbrook areas
*Scutellaria bolanderi austromontana*, Southern skullcap -- wet chaparral and montane areas
*Senecio ganderi*, Gander's butterweed [CA rare] -- gabbro soils in interior regions
*Senecio sp novum**, -- urban canyon in Chula Vista area, currently being described, shrub
*Sibaropsis hammittii*, Hammitt's claycress -- gabro foothills, Viejas Mtn
*Streptanthus campestris*, Southern jewelflower -- pinyon juniper area
*Stylocline citroleum*, Oil neststraw -- coastal areas, last collected in 1935
*Suaeda esteroa*, Estuary seablite -- coastal salt marsh
*Tetracoccus dioicus*, Parry's tetracoccus -- chaparral on gabbro and metavolcanic soils
*Thermopsis californica semota*, Velvety false lupine -- montane meadows
*Viguiera purissimae*, La Purissima viguiera -- CSS in one location on Camp Pendleton, disjunct from central Baja California
*Xylorhiza orcuttii*, Orcutt's woolly aster -- gypsum soils in desert canyons

**LIST B** (Plants rare, threatened or endangered in California but more common elsewhere)

*Adolphia californica*, San Diego adolphia -- clay soils in CSS, chaparral and grasslands
*Agave shawii*, Shaw's agave [NE] -- coastal terraces
*Ambrosia chenopodiifolia*, San Diego bur sage -- CSS around Otay
*Astragalus insularis harwoodii*, Harwood's milkvetch -- desert dunes at eastern base of mountains, sandy or gravely
*Ayenia compacta*, Ayenia -- desert canyons
*Bergerocactus emoryi*, Golden snake cactus -- coastal bluff and near Otay, closed cone conifer forest, chaparral, CSS, sandy
*Bursera microphylla*, Elephant tree -- desert slopes
*Calliandra eriophylla*, Fairy duster -- desert canyons, sandy or rocky
*Carlowrightia arizonica*, Arizona carlowrightia -- desert scrub, sandy, granitic alluvium
*Ceanothus verrucosus*, Wart stemmed ceanothus -- coastal mixed chaparral
*Chamaesyce arizonica*, Arizona spurge -- sandy desert scrub

*Colubrina californica*, Las Animas colubrina -- high desert scrub
*Cordylanthus orcuttianus*, Orcutt's bird's beak -- CSS in South County near Otay, Chula Vista dn Imperial Beach
*Coreopsis maritima*, Sea dahlia -- coastal bluff
*Dudleya attenuata orcuttii*, Orcutt's dudleya -- Border Field State Park
*Ericameria palmeri palmeri*, Palmer's goldenbush [NE] -- south coastal and interior arroyos, mesic
*Erodium macrophyllum*, Large-leaf fillary -- clay soils in open areas of grassland or CSS in coastal valleys
*Eucnide rupestris*, Rock nettle -- desert canyons and cliff bottoms
*Euphorbia misera*, Cliff spurge -- coastal bluff
*Ferocactus viridescens*, Coast barrel cactus -- coastal mesas and hillsides
*Frankenia palmeri*, Yerba reuma -- salt marsh near South Bay
*Geraea viscida*, Sticky geraea -- southern foothill and desert transition, chaparral, often in disturbed areas
*Herissantia crispa*, Curly herissantia -- eastern desert slopes
*Heuchera rubescens versicolor*, San Diego County alum root -- rocky mountain cliff slopes, conifer forest, chaparral, Hot Springs & Palomar Mts.
*Hulsea mexicana*, Mexican hulsea -- desert mountain areas near Jacumba
*Ipomopsis tenuifolia*, Slender leaved ipomopsis -- desert transition in SE part of County
*Iva hayesiana*, San Diego marsh elder -- south coastal arroyos and ravines
*Lewisia brachycalyx*, Southwestern bitterroot -- near Cuyamaca Lake, conifer forests and meadows/seeps
*Linanthus bellus*, Desert beauty -- interior and desert transition chaparral in southern edge of County, sandy
*Lycium parishii*, Parish's desert thorn -- low desert flats
*Machaeranthera asteroides lagunensis*, Laguna Mountain aster [CA rare] -- meadows and openings in forest on Mt. Laguna
*Malperia tenuis*, Brown turbins -- desert pavement
*Matelea parvifolia*, Climbing spearleaf -- desert washes and canyons
*Mentzelia hirsutissima*, Hairy stickleaf -- sandy soil, low desert
*Nama stenocarpum*, Mud nama -- muddy, lake edges
*Nemacaulis denudata gracilis*, Slender woolly heads -- sandy desert areas and coastal dunes
*Ornithostaphylos oppositifolia*, Palo blanco -- hills south of Tiajuana River valley
*Quercus cedrosensis*, Cedros Island oak -- south slope of Otay Mountain
*Rhus trilobata simplicifolia*, Single leaf basket bush -- pinyon juniper, Pinyon and Vallecito Mts.
*Rosa minutifolia*, Small leaved rose [CA rare] -- Otay mesa, CSS/chaparral,
*Salvia munzii*, Munz sage -- southern CSS/chaparral near Otay Mountain and Otay Mesa also Dictionary Hill and Jamul Mts.
*Selaginella eremophila*, Desert spike moss -- desert slopes, gravelly/rocky
*Senecio aphanactis*, Rayless ragwort -- coastal scrub, chaparral, woodlands, alkaline
*Senna covesii*, Cove's cassia -- desert valley edges
*Spermolepis echinata*, Spermolepis -- Borrego Valley, sandy or rocky, desert scrub
*Stemodia durantifolia*, Blue streamwort -- dry edge of reservoir and streams on Otay Mtn.
*Viola aurea*, Golden violet -- pinyon juniper areas, sandy

**LIST C** (Plants which may be quite rare, but need more information to determine their true rarity status)

*Berberis fremontii*, Fremont barberry -- interior chaparral, pinyon juniper woodland, rocky
*Camissonia lewisii*, Lewis sun cup -- CSS, grasslands, cismontane woodlands, coastal areas, sandy or clay
*Ditaxis serrata californica*, California ditaxis -- desert scrub
*Dudleya alainiae*, Reiser's dudleya -- rocky leeward slopes of mountains
*Githopsis diffusa filicaulis*, Mission canyon bluecup -- CSS in Mission Valley, but also in Silverwood Wildlife Sanctuary
*Hordeum intercedens*, Vernal barley -- seeps and vernal pools
*Myosurus minimus (apus)*, Little mousetail -- vernal pools

*Opuntia wigginsii (Cylindropuntia)*, Wiggins cholla -- low desert, eastern edge of County, sandy

**LIST D** (Plants of limited distribution and are uncommon, but not presently rare or endangered)

*Abronia maritima*, Red sand verbena -- sandy beach areas
*Achnatherum diegoense*, San Diego needlegrass -- clay soils in native grassy areas, chaparral and CSS, rocky, often mesic
*Androsace elongata acuta*, California androsace -- montane grassy slopes
*Artemisia palmeri*, Palmer's sage -- arroyo bottoms in chaparral, CSS, and riparian, sandy, mostly south part of County
*Asplenium vespertinum**, Western spleenwort -- chaparral, woodland, CSS, rocky
*Astragalus crotalariae*, Salton milkvetch -- desert transition
*Astragalus lentiginosus borreganus*, Borrego milkvetch -- desert dunes
*Azolla mexicana*, Mexican mosquito fern -- standing water on ponds
*Calandrinia breweri*, Brewer's calandrinia -- burned areas
*Calandrinia maritima*, Seaside calandrinia -- coastal bluff scrub, CSS, grassland, sandy
*Calochortus catalinae*, Catalina mariposa lily -- coastal grasslands, cismontane woodland, CSS, chaparral
*Caulanthus simulans*, Payson's jewelflower -- sandy, granitic locations in foothills and desert
*Chamaebatia australis*, Southern mountain misery -- chaparral, gabbro and metavolcanic soils
*Chamaesyce revoluta*, Thread -stemmed spurge -- desert mountains, rocky
*Chorizanthe leptotheca*, Peninsular spine flower -- CSS and chaparral
*Convolvulus simulans*, Small flowered morning glory -- coastal clay areas and serpentine seeps, chaparral, CSS, grasslands
*Cryptantha costata*, Ribbed cryptantha -- desert sandy soils
*Cryptantha holoptera*, Winged cryptantha -- desert gravels
*Cynanchum utahense*, Utah vine milkweed -- desert bajadas
*Deinandra (Hemizonia) paniculata*, Paniculate tarplant -- grassy areas, coast & foothills, Bonsall to Otay
*Delphinium parishii subglobosum*, Desert larkspur -- desert transition and rocky locations
*Dichondra occidentalis*, Western dichondra -- coastal mixed chaparral and north county CSS, grasslands, woodlands
*Galium johnstonii*, Johnston's bedstraw -- Palomar Mtn
*Gilia caruifolia*, Caraway leaved gilia -- east slopes of Palomar Mtn
*Harpagonella palmeri*, Palmer's grappling hook -- CSS in South County, chaparral, grassland, clay
*Heterotheca sessiliflora sanjacintensis**, San Jacinto golden aster -- North Mtn ecoregion, mixed chaparal and mixed conifer
*Holocarpha virgata elongata*, Graceful tarplant -- coastal mesas and foothills
*Horsfordia newberryi*, Newberry's velvet-mallow -- sonoran desert scrub
*Hulsea vestita callicarpha*, Beautiful hulsea -- chaparral and coniferous forest
*Hymenothrix wrightii*, Wright's hymenothrix -- lower mountain woodlands and conifer forests
*Juglans californica*, California black walnut -- riparian areas near DeLuz
*Juncus acutus leopoldii*, Soutwestern spiny rush -- riparian areas
*Juncus cooperi*, Cooper's rush -- desert alkaline sinks
*Lathyrus splendens*, Pride of California -- south interior chaparral
*Lilium humboldtii ocellatum*, Ocellated Humboldt lily -- shaded montane canyons
*Lycium californicum*, California box-thorn -- maritime succulent scrub
*Lyrocarpa coulteri palmeri*, Palmer's lyrepod -- desert canyons
*Machaeranthera juncea*, Rush like bristle bush -- chaparral and CSS in South County
*Microseris douglasii platycarpha*, Small flowered microseris -- CSS and clay soils
*Mimulus aridus*, Desert monkey flower -- desert transition
*Mimulus clevelandii*, Cleveland's monkey flower -- foothill and mountain peaks
*Mimulus diffusus*, Palomar monkey flower -- montane and coastal mixed chaparral
*Mirabilis tenuiloba*, Slender lobed four o'clock -- desert canyons
*Mucronea californica*, California spine flower -- coastal sandy soils (also inland)
*Ophioglossum californicum*, California adder's tongue fern -- vernal pools, coastal mesas, and coastal mixed chaparral, mesic

*Opuntia wolfii (Cylindropuntia)*, Wolf's cholla -- low desert scrub
*Orobanche parishii brachyloba*, Short lobed broom rape -- sandy bluffs
*Pectocarya peninsularis*, Baja California bur-comb -- rare in Borrego Valley (not in CNPS)
*Penstemon clevelandii connatus*, San Jacinto beard tongue -- rocky desert slopes and mountains
*Penstemon thurberi*, Thurber's beardtongue -- pinyon juniper areas, chaparral
*Pentachaeta aurea*, Golden-rayed pentachaeta -- open chaparral and CSS as well as montane conifer forests
*Perideridia gairdneri gairdneri*, Gairdner's yampah -- moist coastal and montane areas
*Pilostyles thurberi*, Thurber's pilostyles -- Carrizo badlands overlook, grows on Psorothamnus emoryi
*Piperia cooperi*, Cooper's rein orchid -- vernally moist areas, coast & foothills
*Piperia leptopetala*, Narrow-petaled rein orchid -- shrublands and woodlands at middle elevations
*Polygala cornuta fishiae*, Fish's milkwort -- foothill peaks (chaparral, woodlands, riparian) especially metavolcanic and gabbro
*Proboscidea althaeifolia*, Desert unicorn plant -- desert washes, sandy
*Quercus engelmannii*, Engelmann oak -- interior valleys and slopes
*Romneya coulteri*, Coulter's matilija poppy -- chaparral and CSS, often in burns
*Rupertia rigida*, Parish psoralea -- montane forest near Cuyamaca
*Salvia eremostachya*, Desert sage -- norhtern desert canyons, rocky/gravelly
*Selaginella asprella*, Bluish spike moss -- montane chaparral, granitic/rocky
*Selaginella cinerascens*, Mesa club moss -- coastal mesas
*Streptanthus bernardinus*, Laguna Mtns. Jewelflower -- montane peak tops
*Suaeda taxifolia*, Woolly seablite -- margins of castal salt marshes
*Viguiera laciniata*, San Diego sunflower -- CSS in sourthern part of County

<u>Removed from July 2001 County Sensitive Plant List</u>
*Astragalus leucolobus*, Bear valley woollypod -- conifer forest, Santa Rosa Mts (removed because it is not found in San Diego County)
*Boykinia rotundifolia*, Round leaved boykinia -- moist montane (removed because too common)
*Castilleja lasiorhyncha*, San Bernardino Mtns. owl's clover -- montane meadow San Bernardino mountians (removed because it is not found in San Diego County)
*Chorizanthe procumbens*, Prostrate spineflower -- northern foothills (removed because too common)

Key to abbreviations
FE – Federally Endangered
FT – Federally Threatened
CE – California Endangered
CT – California Threatened
CA rare – rare in California, but not listed
NE – MSCP Narrow Endemic
CSS – Coastal sage scrub
* – newly added since Sept 1999 list (25 additions)

## Table 3

## San Diego County Sensitive Animal List

### Group 1 Species

| | |
|---|---|
| *Accipiter cooperi,* Cooper's hawk | *Ictera virens,* Yellow-breasted chat |
| *Accipiter striatus,* Sharp-shinned hawk | *Lanius ludovicianus* ,Loggerhead shrike |
| *Aechmophorus occidentalis,* Western Grebe | *Linderiella occidentalis,* California lindellaria |
| *Agelaius tricolor,* Tricolored blackbird | *Lycaena hermes,* Hermes copper |
| *Aimophila ruficeps canescens,* Rufous-crowned sparrow | *Melanerpes lewis,* Lewis' woodpecker (Winter) |
| *Ammodramus savannarum,* Grasshopper sparrow | *Mitoura thornei,* Thornes hairstreak butterfly |
| *Amphispiza belli belli,* Bell's sage sparrow | *Oncorhynchus mykiss,* Rainbow Trout -- Steelhead form |
| *Apodemia mormo peninsularis,* Peninsular metalmark | *Ovis canadensis nelsoni,* Peninsular bighorn sheep |
| *Aquila chrysaetos,* Golden eagle | *Pandion haliaetus,* Osprey (Rarely breeds) |
| *Asio otus,* Long-eared owl | *Panoquina errans,* Wandering salt marsh skipper |
| *Athene cunicularia hypugea,* Burrowing owl | *Papilio multiculdata,* Two-tailed swallowtail |
| *Batrachoseps aridus,* Desert slender salamander | *Passerculus sandwichensis beldingii,* Belding's savannah sparrow |
| *Branchinecta sandiegoensis,* San Diego fairy shrimp | *Perognathus longimembris pacificus,* Pacific pocket mouse |
| *Bufo microscaphus californicus,* Arroyo toad | *Phrynosoma mcallii,* Flat tailed horned lizard |
| *Buteo lineatus,* Red-shouldered hawk | *Plebejus saepiolis hilda,* Hilda blue |
| *Buteo regalis,* Ferruginous hawk (Winter) | *Plegadis chihi,* White-faced ibis |
| *Buteo swainsoni,* Swainson's hawk (Winter) | *Polioptila californica californica,* California gnatcatcher |
| *Campylorhynchus brunnicapillus couesi,* San Diego cactus wren | *Progne subis,* Purple Martin |
| *Cathartes aura,* Turkey vulture | *Pseudocopaeodes eunus eunus,* Alkali skipper |
| *Ccoelus globosus,* Globose dune beetle | *Pyrgus ruralis lagunae,* Laguna Mtn. Skipper |
| *Charadrius alexandrinus nivosus,* Western snowy plover | *Pyrocephalus rubinus,* Vermilion flycatcher |
| *Circus cyaneus hudsonius,* Northern harrier | *Rallus longirostris levipes,* Light-footed clapper rail |
| *Clemmys marmorata pallida,* Southwestern pond turtle | *Rana muscosa,* Mountain yellow legged frog |
| *Coccyzus americanus occidentalis,* Yellow-billed cuckoo | *Rana aurora draytoni,* California red -legged frog |
| *Coleonyx variegatus abbottii,* San Diego banded gecko | *Riparia riparia,* Bank swallow (Formerly bred) |
| *Dipodomys stephensi,* Stephen's kangaroo rat | *Rynchops niger,* Black skimmer |
| *Elanus caeruleus,* Black-shouldered kite | *Sterna antillarum browni,* California least tern |
| *Empidonax trailii extimus,* Southwestern willow flycatcher | *Sterna elegans,* Elegant tern |
| *Ensatina eschscholtzii klauberi,* Large-blotched salamander | *Streptocephalus woottoni,* Riverside fairy shrimp |
| *Eucyclogobius newberryi,* Tidewater goby | *Strix occidentalis occidentalis,* California spotted owl |
| *Euphydryas editha quino,* Quino checkerspot butterfly | *Thamnophis hammondii,* Two stripe garter snake |
| *Euphys vestris harbisoni,* Dun skipper | *Toxostoma crissale,* Crissal thrasher (Mesquite riparian) |
| *Falco mexicanus,* Prairie falcon | *Uma notata notata,* Colorado desert fringe-toed lizard |
| *Falco peregrinus anatum,* American peregrine falcon | *Vireo bellii pusillus,* Least Bell's vireo |
| *Gila orcutti,* Arroyo chub | *Vireo vicinior,* Gray vireo |
| *Haliaeetus leucocephalus*, Bald eagle (Winter) | |

## Group 2 Species

| | |
|---|---|
| *Anas strepera,* Gadwall | *Grus Canadensis,* Sandhill crane |
| *Anniella pulchra pulchra,* Silvery legless lizard | *Helminthoglypta traski coelata,* Peninsular Range shoulderband snail |
| *Anser caerulescens,* Snow goose (Winter) | *Ixobrychus exilis hesperis,* Least bittern |
| *Antrozous pallidus,* Pallid bat | *Junco hyemalis caniceps,* Gray-headed junco (Winter-rare) |
| *Ardea herodias,* Great blue heron | *Lampropeltis zonata pulchra,* San Diego mountain kingsnake |
| *Ariolimax columbianus stramineas,* Palomar banana slug | *Larus atricilla,* Laughing gull (Non breeding, very rare) |
| *Asio flammeus,* Short-eared owl (Winter) | *Larus californicus,* California gull (Non-breeding) |
| *Aythya Americana,* Redhead | *Lasiurus blossevillii,* Western red bat |
| *Bassariscus astutus,* Ringtail | *Laterallus jamaicensis coturniculus,* California black rail (extirpated) |
| *Branta Canadensis,* Canada goose (Winter) | *Lepus californicus bennettii,* San Diego black-tailed jackrabbit |
| *Brennania belkini,* Belkin's dune fly | *Macrotus californicus,* California leaf-nosed bat |
| *Bucephala islandica,* Barrow's goldeneye (Winter) | *Megathymus yuccae harbisoni,* Coastal giant skipper |
| *Butorides striatus,* Green heron | *Mycteria Americana,* Wood stork (Non-breeding, very rare) |
| *Cerorhinca monocerata,* Rhinoceros auklet (Oceanic – Winter) | *Myotis ciliolabrum,* Small-footed myotis |
| *Chaetodipus californicus femoralis,* Dulzura Calif. pocket mouse | *Myotis evotis,* Long eared myotis |
| *Chaetodipus fallax fallax,* Northwestern San Diego pocket mouse | *Myotis thysanodes,* Fringed myotis |
| *Chaetodipus fallax pallidus,* Pallid San Diego pocket mouse | *Myotis volans,* Long legged myotis |
| *Charadrius montanus,* Mountain plover (Winter) | *Myotis yumanensis,* Yuma myotis |
| *Charina trivirgata roseofusca,* Coastal rosy boa | *Neotoma lepida intermedia,* San Diego desert woodrat |
| *Chlidonias niger,* Black tern (Non-breeder) | *Numenius americanus,* Long-billed curlew (Non-breeding) |
| *Choeronycteris mexicana,* Mexican long-tongued bat | *Nyctinomops macrotis,* Big free-tailed bat |
| *Cicindela gabbi,* Gabb's tiger beetle | *Nyctinomops femorosaccus,* Pocketed free-tailed bat |
| *Cicindela latesignata latesignata,* Sand dune tiger beetle | *Oceanodroma furcata plumbea,* Fork-tailed storm petrel (Ocean) |
| *Cicindela sinilis frosti,* Tiger beetle | *Oceanodroma homochroa,* Ashy storm petrel (Ocean) |
| *Cicindela trifasciata sigmoidia,* Mudflat tiger beetle | *Oceanodroma melania,* Black storm petrel (Ocean) |
| *Cincindela hirticollis gravida,* Sandy beach tiger beetle | *Odocoileus hemionus,* Southern mule deer |
| *Cincindela latesignata obliviosa,* Oblivious tiger beetle | *Onychomys torridus Ramona,* Southern grasshopper mouse |
| *Cnemidophorus hyperythrus,* Belding's orange-throated whiptail | *Oreortyx pictus eremophila,* Mountain quail |
| *Cnemidophorus tigris multiscutatus,* Coastal western whiptail | *Passerculus sandwichensis rostratus,* Large-billed savannah sparrow |
| *Coleonyx switaki,* Barefoot gecko | *Pelecanus erythrorhynchos,* American white pelican (Winter) |
| *Contopus borealis,* Olive-sided flycatcher | *Pelecanus occidentalis californicus,* California brown pelican |
| *Corynorhinus townsendii,* Townsend's big-eared bat | *Perognathus longimembris brevinasus,* Los Angeles little pocket mouse |
| *Crotalus ruber rubber,* Northern red diamond rattlesnake | *Perognathus longimembris internationalis,* Jacumba little pocket mouse |
| *Cyprinodon macularis,* Desert pupfish | *Phalacrocorax auritus,* Double-crested cormorant (Non-breeding) |
| *Cypseloides niger,* Black swift (Non-breeder) | *Phobetus robinsoni,* Robinson's rain beetle |
| *Danaus plexippus,* Monarch butterfly | *Phrynosoma coronatum blainvillei,* San Diego horned lizard |
| *Dendrocygne bicolor,* Fulvous whistling-duck | *Piranga rubra,* Summer Tanager |
| *Dendroica petechia brewsteri,* Yellow warbler | *Salvadora hexalepis virgultea,* Coast patch-nosed snake |
| *Diadophis punctatus similes,* San Diego ringneck snake | *Sauromalus obesus,* Chuckwalla |
| *Egretta rufescens,* Reddish egret | *Scaphiopus hammondii,* Western spadefoot toad |
| *Endomychura hypoleuca,* Xantus murrelet (Oceanic) | *Sceloporus graciosus vandenburgianus,* Southern sagebrush lizard |
| *Eremophila alpestris actis,* Horned lark | *Sialia mexicana,* Western bluebird |
| *Euderma maculatum,* Spotted bat | *Taricha torosa torosa,* California newt |
| *Eumeces skiltonianus interparietalis,* Coronado skink | *Taxidea taxus,* American badger |
| *Eumops perotis californicus,* Greater western mastiff bat | *Thamnophis sirtalis ssp. Novum,* South Coast garter snake |
| *Falco columbarius,* Merlin (Winter) | *Toxostoma bendirei,* Bendire's thrasher (Non-breeding) |
| *Felis concolor,* Mountain lion | *Toxostoma lecontei lecontei,* Leconte's thrasher |
| *Fratercula cirrhata,* Tufted puffin (Oceanic) | *Trigonoscuta blaisdelli,* Blaisdell trigonoscuta weevil |
| *Gasterosteus aculeatus williamsoni,* Unarmored three-spine stickleback | *Tryonia imitator,* Mimic tryonia snail |
| *Gavia immer,* Common loon (Winter) | *Tyto alba,* Common barn-owl |

## Table 4

## Terrestrial Vegetation Communities in San Diego County Based on Holland's Descriptions

Suggested by
Thomas Oberbauer, DPLU
(revised February 1996)[11,12]

| | | | | | | |
|---|---|---|---|---|---|---|
| 10000 | NON-NATIVE VEGETATION, DEVELOPED AREAS, OR UNVEGETATED HABITAT | | | | | |
| | 11000 | Non-Native Vegetation | | | | |
| | | 11100 | Eucalyptus Woodland | | | |
| | | 11200 | Disturbed Wetland | | | |
| | | 11300 | Disturbed Habitat | | | |
| | 12000 | Urban/Developed | | | | |
| | 13000 | Unvegetated Habitat | | | | |
| | | 13100 | Open Water | | | |
| | | | 13110 | Marine | | |
| | | | | 13111 | Subtidal | |
| | | | | 13112 | Intertidal | |
| | | | 13120 | Bay | | |
| | | | | 13121 | Deep Bay | |
| | | | | 13122 | Intermediate Bay | |
| | | | | 13123 | Shallow Bay | |
| | | | 13130 | Estuarine | | |
| | | | | 13131 | Subtidal | |
| | | | | 13132 | Intertidal | |
| | | | | 13133 | Brackishwater | |
| | | | 13140 | Fresh Water | | |
| | | 13200 | Non-Vegetated Channel, Floodway, Lakeshore Fringe | | | |
| | | 13300 | Saltpan/Mudflats | | | |
| | | 13400 | Beach | | | |
| | 18000 | General Agriculture | | | | |
| | | 18100 | Orchards and Vinyards | | | |
| | | 18200 | Intensive Agriculture - Dairies, Nurseries, Chicken Ranches | | | |
| | | 18300 | Extensive Agriculture - Field/Pasture, Row Crops | | | |
| | | | 18310 | Field/Pasture | | |
| | | | 18320 | Row Crops | | |
| 20000 | DUNE COMMUNITY | | | | | |
| | 21000 | Coastal Dunes | | | | |
| | | 21100 | Active Coastal Dunes (occurred at one time but now nearly extirpated) | | | |
| | | 21200 | Foredunes | | | |
| | | | 21230 | Southern Foredunes (tiny fragments remaining in Imperial Beach and Los Peñasquitos Lagoon) | | |
| | 22000 | Desert Dunes | | | | |
| | | 22100 | Active Desert Dunes (very little in Borrego Valley) | | | |
| | | 22300 | Stabilized and Partially-Stabilized Desert Sand Field (mostly in the eastern part of Borrego Valley; may be large enough to map from aerials) | | | |

[11]Bold indicates current revisions to Holland.
[12]Asterisk indicates prior revisions to Holland (see May 1995 version).

| | | | | | | |
|---|---|---|---|---|---|---|
| | 24000 | Stabilized Alkaline Dunes* | | | | |
| 29000 | ACACIA SCRUB* | | | | | |
| 30000 | DUNE COMMUNITY | | | | | |
| | 31000 | Coastal Bluff Scrub | | | | |
| | | 31200 | Southern Coastal Bluff Scrub (mapped in Point Loma and Torrey Pines State Park) | | | |
| | 32000 | Coastal Scrub | | | | |
| | | 32400 | Maritime Succulent Scrub (Point Loma, etc.) | | | |
| | | 32500 | Diegan Coastal Sage Scrub | | | |
| | | | 32510 | Coastal form* | | |
| | | | 32520 | Inland form (>1,000 ft. elevation)* | | |
| | | 32700 | Riversidian Sage Scrub | | | |
| | | | 32710 | Riversidian Upland Sage Scrub (scrub on Banner Grade may fit this category) | | |
| | | | 32720 | Alluvial Fan Scrub | | |
| | | 33000 | Sonoran Desert Scrub | | | |
| | | | 33100 | Sonoran Creosote Bush Scrub | | |
| | | | 33200 | Sonoran Desert Mixed Scrub | | |
| | | | | 33210 | Sonoran Mixed Woody Scrub | |
| | | | | 33220 | Sonoran Mixed Woody and Succulent Scrub | |
| | | | | 33230 | Sonoran Wash Scrub* | |
| | | | 33300 | Colorado Desert Wash Scrub* | | |
| | | | 33500 | Calcicolous Scrub* | | |
| | | | 33600 | Encelia Scrub* | | |
| | | 34000 | Mojavean Desert Scrub | | | |
| | | | 34300 | Blackbush Scrub (micro locations on eastern edge of mountains) | | |
| | | 35000 | Great Basin Scrub | | | |
| | | | 35200 | Sagebrush Scrub | | |
| | | | | 35210 | Big Sagebrush Scrub | |
| | | 36000 | Chenopod Scrub | | | |
| | | | 36110 | Desert Saltbush Scrub | | |
| | | | 36120 | Desert Sink Scrub (in Borrego sink) | | |
| | | 37000 | Chaparral | | | |
| | | | 37100 | Upper Sonoran Mixed Chaparral | | |
| | | | | 37120 | Southern Mixed Chaparral | |
| | | | | | 37121 | Granitic Southern Mixed Chaparral |
| | | | | | 37122 | Mafic Southern Mixed Chaparral (occurs on Los Posas and Boomer soils) |
| | | | | 37130 | Northern Mixed Chaparral* | |
| | | | | | 37131 | Granitic Northern Mixed Chaparral* |
| | | | | | 37132 | Mafic Northern Mixed Chaparral* |
| | | | 37200 | Chamise Chaparral | | |
| | | | | 37210 | Granitic Chamise Chaparral* | |
| | | | | 37220 | Mafic Chamise Chaparral* | |
| | | | 37300 | Red Shank Chaparral (near Campo and Chihuahua Valley) | | |
| | | | 37400 | Semi-Desert Chaparral (same as Desert Transition Chaparral; occurs in areas like Jacumba) | | |
| | | | 37500 | Montane Chaparral | | |
| | | | | 37510 | Mixed Montane Chaparral | |
| | | | | 37520 | Montane Manzanita Chaparral | |
| | | | | 37530 | Montane Ceanothus Chaparral | |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 37540 | Montane Scrub Oak Chaparral |
| | | | 37800 | | Upper Sonoran Ceanothus Chaparral |
| | | | | 37810 | Buck Brush Chaparral |
| | | | | 37830 | Ceanothus crassifolius Chaparral |
| | | | 37900 | | Scrub Oak Chaparral |
| | | | 37A00 | | Interior Live Oak Chaparral |
| | | | 37B00 | | Upper Sonoran Manzanita Chaparral |
| | | | 37C00 | | Maritime Chaparral |
| | | | | 37C30 | Southern Maritime Chaparral (occurs in coastal San Diego County and has been described as Coastal Mixed Chaparral) |
| | | | 37G00 | | Coastal Sage-Chaparral Scrub |
| | | | 37K00 | | Flat-topped Buckwheat* |
| | | 39000 | | | Upper Sonoran Subshrub Scrub |
| 40000 | | | | | GRASSLANDS, VERNAL POOLS, MEADOWS, AND OTHER HERB COMMUNITIES |
| | 42000 | | | | Valley and Foothill Grassland |
| | | 42100 | | | Native Grassland |
| | | | 42110 | | Valley Needlegrass Grassland |
| | | | 42120 | | Valley Sacaton Grassland |
| | | 42200 | | | Non-Native Grassland |
| | | 42300 | | | Wildflower Field (this is actually a subset of the above, but would be pertinent in the Cuyamaca Lake and Mataguay Valley areas) |
| | | 42400 | | | Foothill/Mountain Perennial Grassland* |
| | 44000 | | | | Vernal Pool |
| | | 44300 | | | San Diego Mesa Vernal Pool |
| | | | 44321 | | San Diego Mesa Hardpan Vernal Pool (northern mesas) |
| | | | 44322 | | San Diego Mesa Claypan Vernal Pool (southern mesas) |
| | 45000 | | | | Meadow and Seep |
| | | 45100 | | | Montane Meadow |
| | | | 45110 | | Wet Montane Meadow |
| | | | 45120 | | Dry Montane Meadows |
| | | 45300 | | | Alkali Meadows and Seeps |
| | | | 45320 | | Alkali Seep |
| | | 45400 | | | Freshwater Seep |
| | 46000 | | | | Alkali Playa Community |
| | | 46100 | | | Badlands/Mudhill Forbs* |
| 50000 | | | | | BOG AND MARSH |
| | 52000 | | | | Marsh and Swamp |
| | | 52100 | | | Coastal Salt Marsh |
| | | | 52120 | | Southern Coastal Salt Marsh |
| | | 52300 | | | Alkali Marsh |
| | | | 52310 | | Cismontane Alkali Marsh |
| | | 52400 | | | Freshwater Marsh |
| | | | 52410 | | Coastal and Valley Freshwater Marsh |
| | | | 52420 | | Transmontane Freshwater Marsh (San Felipe Creek) |
| | | | 52430 | | Montane Freshwater Marsh |
| | | | 52440 | | Emergent Wetland |
| 60000 | | | | | RIPARIAN AND BOTTOMLAND HABITAT |
| | 61000 | | | | Riparian Forests |
| | | 61300 | | | Southern Riparian Forest |
| | | | 61310 | | Southern Coast Live Oak Riparian Forest |

| | | | | | |
|---|---|---|---|---|---|
| | | | 61320 | | Southern Arroyo Willow Riparian Forest |
| | | | 61330 | | Southern Cottonwood-willow Riparian Forest |
| | | 61500 | Montane Riparian Forest | | |
| | | | 61510 | | White Alder Riparian Forest (Cold Spring in the Cuyamaca Mountains) |
| | | 61800 | Colorado Riparian Forest | | |
| | | | 61810 | | Sonoran Cottonwood-willow Riparian Forest (Coyote Canyon) |
| | | | 61820 | | Mesquite Bosque (Borrego Sink) |
| | 62000 | Riparian Woodlands | | | |
| | | 62200 | Desert Dry Wash Woodland | | |
| | | 62300 | Desert Fan Palm Oasis Woodland | | |
| | | 62400 | Southern Sycamore-alder Riparian Woodland (Pauma and Pala areas) | | |
| | 63000 | Riparian Scrubs | | | |
| | | 63300 | Southern Riparian Scrub | | |
| | | | 63310 | | Mule Fat Scrub |
| | | | 63320 | | Southern Willow Scrub |
| | | 63500 | Montane Riparian Scrub | | |
| | | 63800 | Colorado Riparian Scrub | | |
| | | | 63810 | | Tamarisk Scrub |
| | | | 63820 | | Arrowweed Scrub |
| | | | | | |
| 70000 | WOODLAND | | | | |
| | 71000 | Cismontane Woodland | | | |
| | | 71100 | Oak Woodland | | |
| | | | 71120 | | Black Oak Woodland (Cuyamaca and Mesa Grande) |
| | | | 71160 | | Coast Live Oak Woodland |
| | | | | 71161 | Open Coast Live Oak Woodland |
| | | | | 71162 | Dense Coast Live Oak Woodland |
| | | | 71180 | | Engelmann Oak Woodland |
| | | | | 71181 | Open Engelmann Oak Woodland |
| | | | | 71182 | Dense Engelmann Oak Woodland |
| | | 71200 | Walnut Woodland | | |
| | | | 71210 | | California Walnut Woodland (micro locations occur, such as in De Luz) |
| | 72000 | Pinon and Juniper Woodlands | | | |
| | | 72300 | Peninsular Pinon and Juniper Woodlands | | |
| | | | 72310 | | Peninsular Pinon Woodland |
| | | | 72320 | | Peninsular Juniper Woodland and Scrub |
| | 75000 | Sonoran Thorn Woodland | | | |
| | | 75100 | Elephant Tree Woodland (micro locations such as Indian Wash) | | |
| | 77000 | Mixed Oak Woodland***** | | | |
| | 78000 | Undifferentiated Open Woodland***** | | | |
| | 79000 | Undifferentiated Dense Woodland***** | | | |
| | | | | | |
| 80000 | FOREST | | | | |
| | 81000 | Broadleaved Upland Forest | | | |
| | | 81100 | Mixed Evergreen Forest (Palomar Mountain) | | |
| | | 81300 | Oak Forest | | |
| | | | 81310 | | Coast Live Oak Forest |
| | | | 81320 | | Canyon Live Oak Forest (may be represented in San Diego County in some form but apparently is intended for more northern areas) |
| | | | 81340 | | Black Oak Forest (as described in Holland represents apparent patches of oak in the midst of coniferous forests) |

| | | | |
|---|---|---|---|
| 83000 | Closed-cone Coniferous Forest | | |
| | 83100 | Coastal Closed-cone Coniferous Forest | |
| | | 83140 | Torrey Pine Forest (not actually a closed cone pine) |
| | 83200 | Interior Closed-cone Coniferous Forest | |
| | | 83230 | Southern Interior Cypress Forest (83330, typo in original Holland document) |
| 84000 | Lower Montane Coniferous Forest | | |
| | 84100 | Coast Range, Klamath and Peninsular Coniferous Forest* | |
| | | 84140 | Coulter Pine Forest |
| | | 84150 | Bigcone Spruce (Bigcone Douglas Fir)-Canyon Oak Forest |
| | 84200 | Sierran Coniferous Forest | |
| | | 84230 | Sierran Mixed Coniferous Forest |
| | 84500 | Mixed Oak/Coniferous/Bigcone/Coulter* | |
| 85000 | Upper Montane Coniferous Forest | | |
| | 85100 | Jeffrey Pine Forest | |

## Table 5

### Habitats and Mitigation Ratios
### (These ratios apply OUTSIDE of approved MSCP Plans)

| Holland Codes | Vegetation Communities | Mitigation Ratio |
|---|---|---|
| 11100 | Eucalyptus Woodland | none |
| 11200 | Disturbed Wetland | 3:1 |
| 11300 | Disturbed Habitat | none |
| 12000 | Urban/Developed | none |
| 13100 | Open Water (13110-13140) | 3:1 |
| 13200 | Non-Vegetated Channel, Floodway, Lakeshore Fringe | 3:1 |
| 13300 | Saltpan/Mudflats | 3:1 |
| 13400 | Beach | 3:1 |
| 18100 | Orchards and Vineyards | none |
| 18200 | Intensive Agriculture - dairies, nurseries, chicken ranches | none |
| 18310 | Extensive Agriculture - field/pasture | 0.5:1 |
| 18320 | Extensive Agriculture - row crops | none |
| 21000 | Coastal Dunes (21100-21230) | 3:1 |
| 22000 | Desert Dunes (22100-22300) | 2:1 |
| 24000 | Stabilized alkaline dunes | 3:1 |
| 29000 | Acacia scrub | 3:1 |
| 31000 | Coastal Bluff Scrub | 3:1 |
| 32400 | Maritime Succulent Scrub | 3:1 |
| 32500 | Diegan Coastal Sage Scrub (32510-32520) | 2:1 |
| 32700 | Riversidian Sage Scrub (32710-32720) | 2:1 |
| 33100 | Sonoran Creosote Bush Scrub | 1:1 |
| 33200 | Sonoran desert mixed scrub (33210-33230) | 1:1 |
| 33300 | Colorado Desert Wash Scrub | 3:1 |
| 33500 | Calcicolous Scrub | 1:1 |
| 33600 | Encelia Scrub | 2:1 |
| 34000 | Mojavean Desert Scrub (34300) | 1:1 |
| 35000 | Great Basin Scrub (35200-35210) | 2:1 |
| 36110 | Desert saltbush scrub | 2:1 |
| 36120 | Desert sink scrub | 3:1 |
| 37121 | Granitic southern mixed chaparral | 0.5:1 |
| 37122 | Mafic southern mixed chaparral | 3:1 |
| 37131 | Granitic northern mixed chaparral | 0.5:1 |
| 37132 | Mafic northern mixed chaparral | 3:1 |

| | | |
|---|---|---|
| 37210 | Granitic chamise chaparral | 0.5:1 |
| 37220 | Mafic chamise chaparral | 3:1 |
| 37300 | Red shank chaparral | 1:1 |
| 37400 | Semi-desert chaparral | 1:1 |
| 37500 | Montane chaparral (37510-37540) | 1:1 |
| 37800 | Upper Sonoran ceanothus chaparral (37810-37830) | 1:1 |
| 37900 | Scrub oak chaparral | 1:1 |
| 37A00 | Interior live oak chaparral | 2:1 |
| 37B00 | Upper Sonoran manzanita chaparral | 1:1 |
| 37C00 | Southern maritime chaparral (37C30) | 3:1 |
| 37G00 | Coastal sage-chaparral scrub | 2:1 |
| 37K00 | Flat-topped buckwheat | 2:1 |
| 39000 | Upper Sonoran subshrub scrub | 1:1 |
| 42100 | Native grassland (42110-42120) | 3:1 |
| 42200 | Non-native grassland | 0.5:1 |
| 42300 | Wildflower field | 3:1 |
| 42400 | Foothill/Mountain Perennial grassland (42470) | 3:1 |
| 44000 | Vernal Pool (44300-44322) | 5:1 |
| 45000 | Meadow and Seep (45100-45400) | 3:1 |
| 46000 | Alkali Playa Community (46100) | 3:1 |
| 52000 | Marsh and Swamp (52100-52440) | 3:1 |
| 61300 | Riparian Forests (61300-61820) | 3:1 |
| 62000 | Riparian Woodlands (62200-62400) | 3:1 |
| 63000 | Riparian Scrubs (63300-63820) | 3:1 |
| 70000 | Woodland (71000-79000) | 3:1 |
| 80000 | Forest (81000-85100) | 3:1 |